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FIELD MANUAL

66-MM HEAT ROCKET M72A1, M72A1E1, and M72

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HEADQUARTERS, DEPARTMENT OF THE ARMY

JULY 1970

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HEADQUARTERS
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WASHINGTON, D.C., *10 July 1970*

66-MM HEAT ROCKET M72A1, M72A1E1, AND M72

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*This manual supersedes FM 23-33, 1 September 1965, including all changes.

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CHAPTER 1
INTRODUCTION

Section I. GENERAL

1. Purpose and Scope

a. This manual provides guidance for using and employing the 66-mm high explosive antitank rocket, M72A1 and M72A1E1 (and M72). It contains information covering the characteristics, nomenclature, functioning, and employment of the M72A1 and M72A1E1 systems. Appendix E has been added for reference on the configuration of the M72.

b. This manual is applicable to nonnuclear and nuclear warfare.

c. Users of this publication are encouraged to submit recommended changes or comments to improve the publication. Comments should be keyed to the specific page, paragraph, and line of the text in which the change is recommended. Reasons should be provided for each comment to insure understanding and complete evaluation. Comments should be prepared on DA Form 2028 (Recommended Changes to Publications) and forwarded direct to the Commandant, United States Army Infantry School, Fort Benning, Ga. 31905.

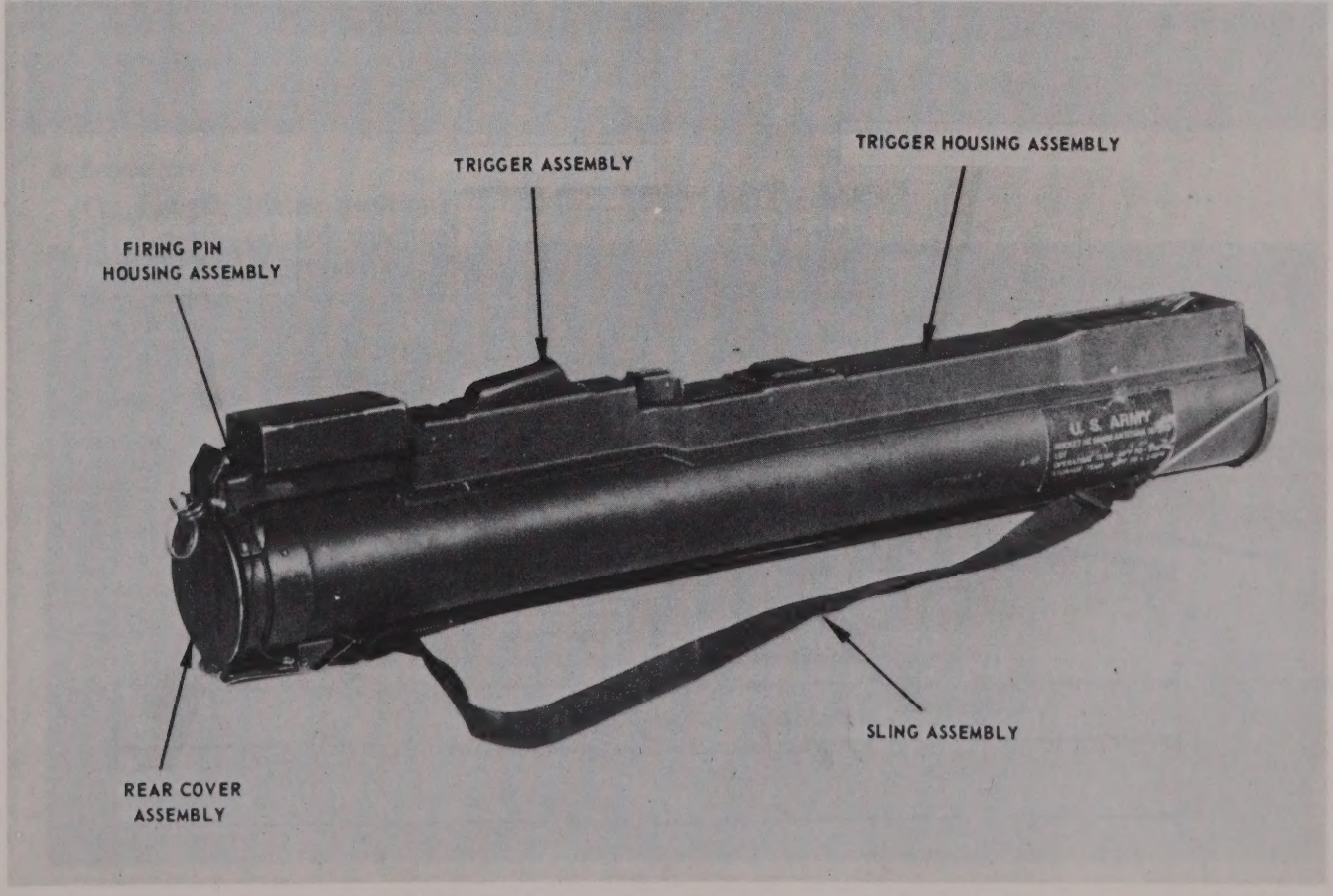


Figure 1. Rocket launcher, closed position.

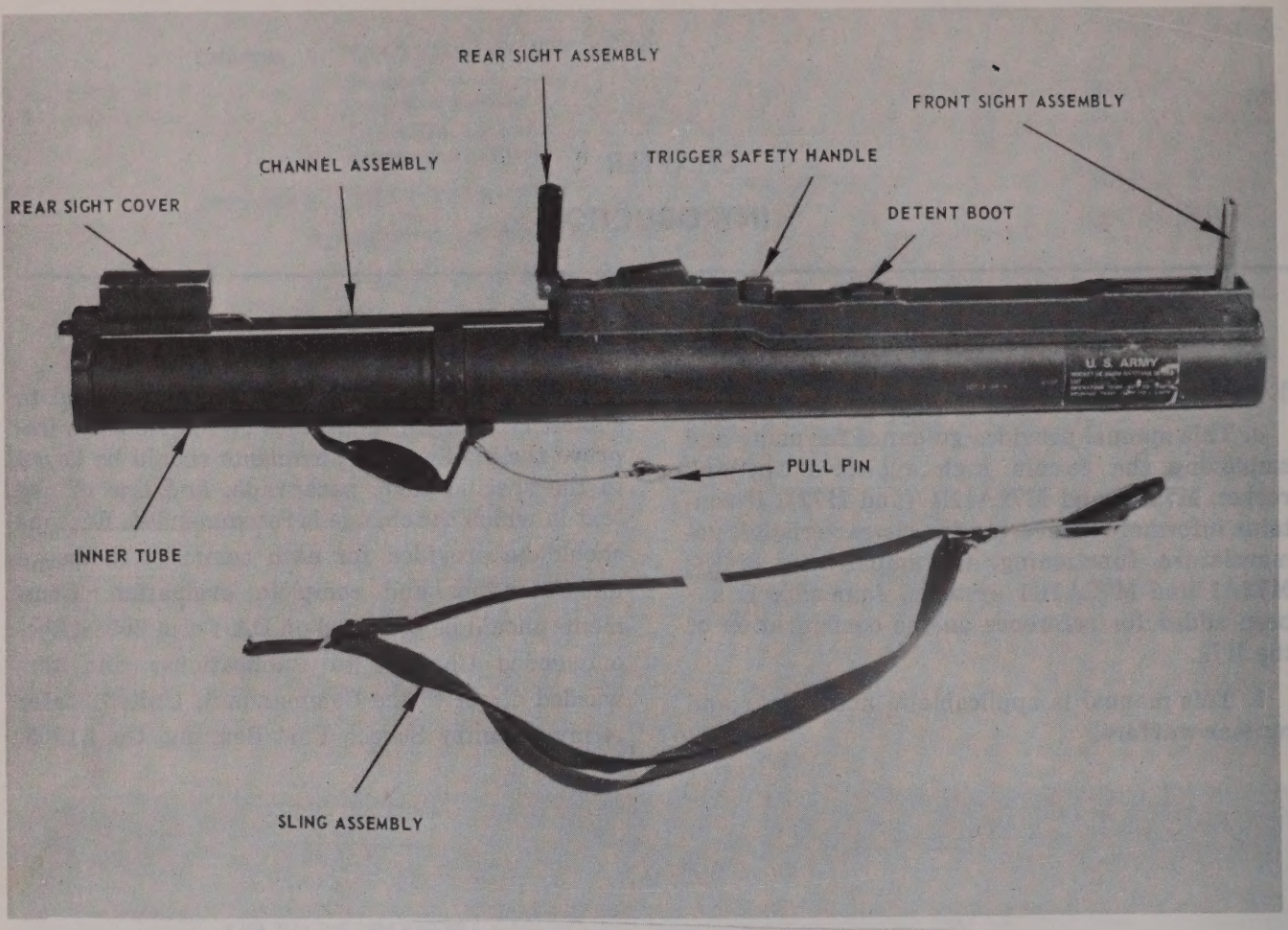


Figure 2. Rocket launcher, open position.

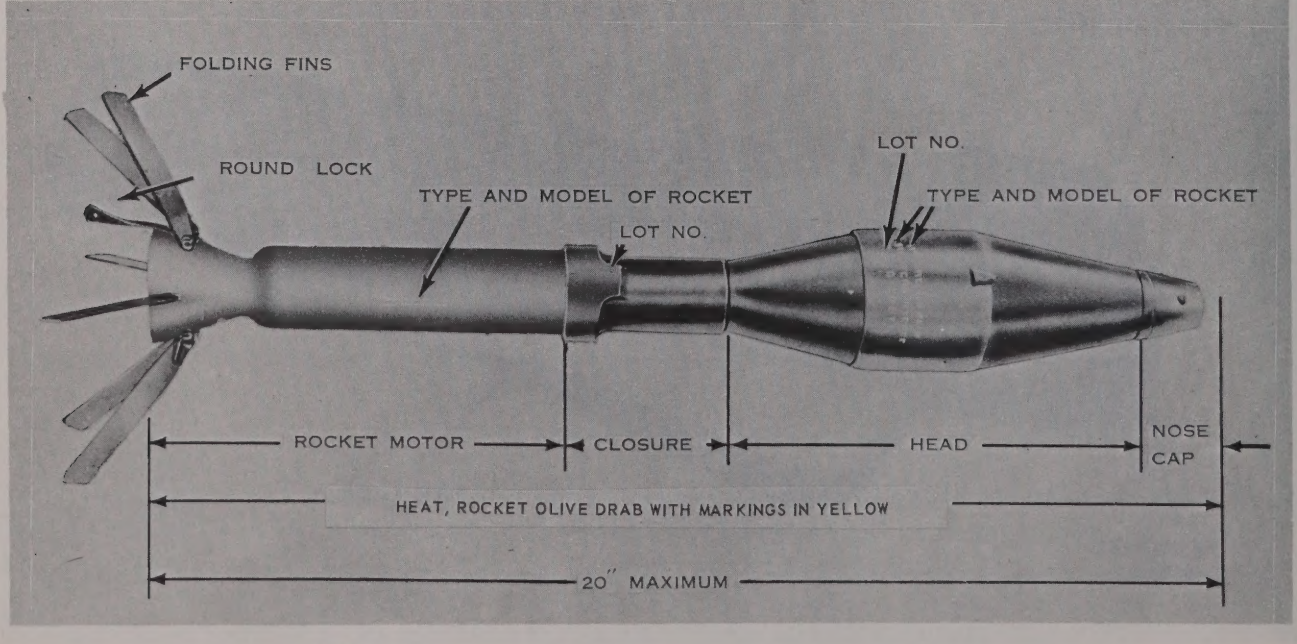


Figure 3. The 66-mm high explosive antitank (HEAT) rocket.

2. General Characteristics

The 66-mm HEAT rocket, M72A1 and M72A1E1 (and M72) is a lightweight, self-contained antitank system consisting of a rocket packed within its own launcher (fig 1). When issued, the launcher serves as a watertight packing container for the rocket, however, when the launcher is placed into the firing position it serves to ignite and guide the rocket on its initial flight toward the intended target (fig 2). The launcher houses a percussion-type firing mechanism to activate the rocket. The rocket is fixed within the launcher and attached to it by means of an integral igniter. The rocket is a percussion ignited, fin stabilized, fixed munition (fig 3).

Section II. DESCRIPTION AND DATA

3. Description

a. Launcher M72A1 and M72A1E1. The launcher for the M72A1 and M72A1E1 is composed of two concentric tubes. The inner tube is oriented with respect to the outer tube by a channel assembly, which rides in an alinement slot in the trigger housing assembly. The outer tube has the following parts affixed to it: the trigger housing assembly located on the upper surface of the outer tube, trigger assembly, trigger safety handle, rear sight assembly, front sight assembly, and rear cover. The inner tube is constructed of aluminum; it will extend telescopically along the channel assembly which houses the firing pin rod assembly and locks the launcher in the extended position through the detent lever assembly. The firing pin rod assembly locks under the trigger assembly and cocks the weapon upon extension.

Note. The difference between the M72A1 rocket and the M72A1E1 rocket pertains to their armor penetrating capability. The M72A1E1 has more penetrating capability.

b. Rocket. The rocket is made up of the 66-mm HEAT warhead M18, the point-initiating-base detonating fuze M412, and the rocket motor M54. Attached to the nozzle of the rocket motor are six spring-loaded fins which are folded forward along the motor when the rocket is within the launcher. Once the rocket motor has been ignited, all of the propellant is burned before the rocket leaves the launcher. The rocket's momentum carries it to the target.

4. Tabulated Data

a. Launcher.

(1) Length (firing position)	35.16 inches.
(2) Length (closed position)	25.77 inches.
(3) Weight (complete system)	4.7 pounds.
(4) Weight (launcher only)	2.5 pounds.
(5) Firing mechanism	Percussion.
(6) Sights:	
(*a*) Front	Reticle graduated in 25-meter range increments, 15 mile per hour lead.
(*b*) Rear	Peepsight adjusts automatically to temperature change.

b. Rocket.

(1) Length	20 inches.
(2) Weight	2¼ pounds (approx).
(3) Muzzle velocity	475 feet per second at 70°F.
(4) Maximum range	1,000 meters (approx).
(5) Maximum effective range	200 meters (based on an average for both moving and stationary targets).

CHAPTER 2
LAUNCHER CONTROLS AND SIGHTING EQUIPMENT

Section I. CONTROLS

5. General

This section describes and illustrates the controls found on the M72A1 and M72A1E1 (and M72).

6. Firing Mechanism

a. The trigger assembly is located on the top rear of the outer tube. The trigger is in the configuration of a bar which must be depressed to fire. When the trigger bar is depressed it will release the tension on the firing pin rod assembly, which strikes the center of the primer.

b. The firing pin housing is affixed to the top rearmost portion of the rear or inner tube. Closely associated with the housing is the firing pin rod assembly, firing pin rod spring, primer block, primer, and rear sight cover. The primer is located on line with the firing pin.

7. Trigger Safety Handle and Recocking

The trigger safety handle must be pushed forward to the release position before the trigger can be depressed. This safety should not be released until the launcher is in the correct firing position on the gunner's shoulder. On the M72A1 and M72A1E1 the trigger safety is a positive safety. When it is placed on the safe position the firing pin rod assembly cannot move to the rear and strike the primer. Cocking is accomplished in the last inch of travel upon extension, therefore, the weapon must be closed at least this far to recock it.

Section II. SIGHTING EQUIPMENT

8. Front Sight

The front sight for the M72A1 and M72A1E1 contains an embossed vertical range line with ranges from 50 to 350 meters in 25-meter increments (fig 4). Two curved stadia lines are etched on the front sight to aid the gunner in range estimation. On either side of the vertical range line are 15 mile per hour lead marks which aid the gunner in tracking moving targets.

9. Rear Sight

The rear sight of the M72A1 and M72A1E1 consists of a steel rear bar sight bracket, a plastic rear sight, and a rubber rear sight boot. Inside the plastic rear sight is the rear sight aperture plate which is attached to a spring that automatically compensates for temperature change.

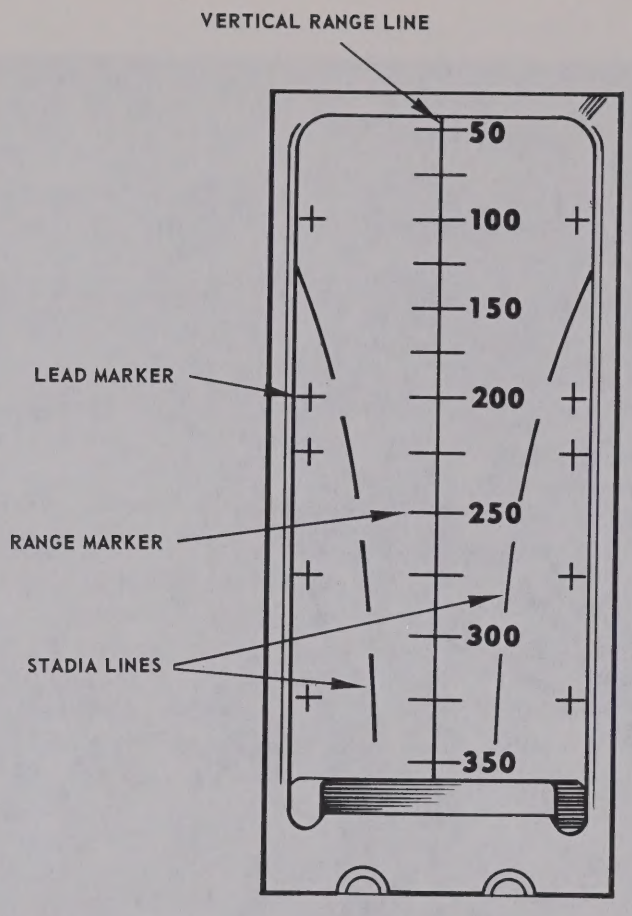


Figure 4. Front sight.

Section III. OPERATION, FUNCTIONING, MALFUNCTIONS, AND IMMEDIATE ACTION

10. General

This section describes the operating procedure for the M72A1 and M72A1E1 (and M72) and the functioning of the launcher. It further explains the most common malfunctions and the correct method of applying immediate action.

11. Operation

a. To prepare the launcher for firing, the gunner can refer to the illustrated firing instructions located on the left side of the launcher (fig 10). The gunner should observe the following procedures:

(1) To place the M72A1 and M72A1E1 into operation remove the pull pin and rotate the rear cover downward, thereby allowing the front cover and adjustable sling assembly to fall free; however, do not discard the sling assembly until the rocket is fired.

(2) To extend the launcher grasp the rear sight cover and sharply pull the launcher to the rear until it locks into position. (Extending the launcher slowly can result in failure to cock the launcher.)

(3) The next step is to place the launcher on the shoulder, push the safety handle to the arm position, aim the launcher, and depress the trigger bar (fig 5 and 6). (If the trigger safety handle will not remain in the arm position, the launcher is not fully extended.)

Caution: **During the operation procedures listed above, the gunner must keep the weapon pointed down range, and insure that all parts of his body are clear of the launcher end. He must check the backblast area to insure it is clear.**

b. In the event the launcher is prepared for firing but is not fired, it may be returned to the carry position by reversing the preparation procedure. Return the trigger safety handle to safe position, depress barrel detent, collapse launch tube, guide front and rear sight into position, and replace sling assembly. Once the launcher is re-

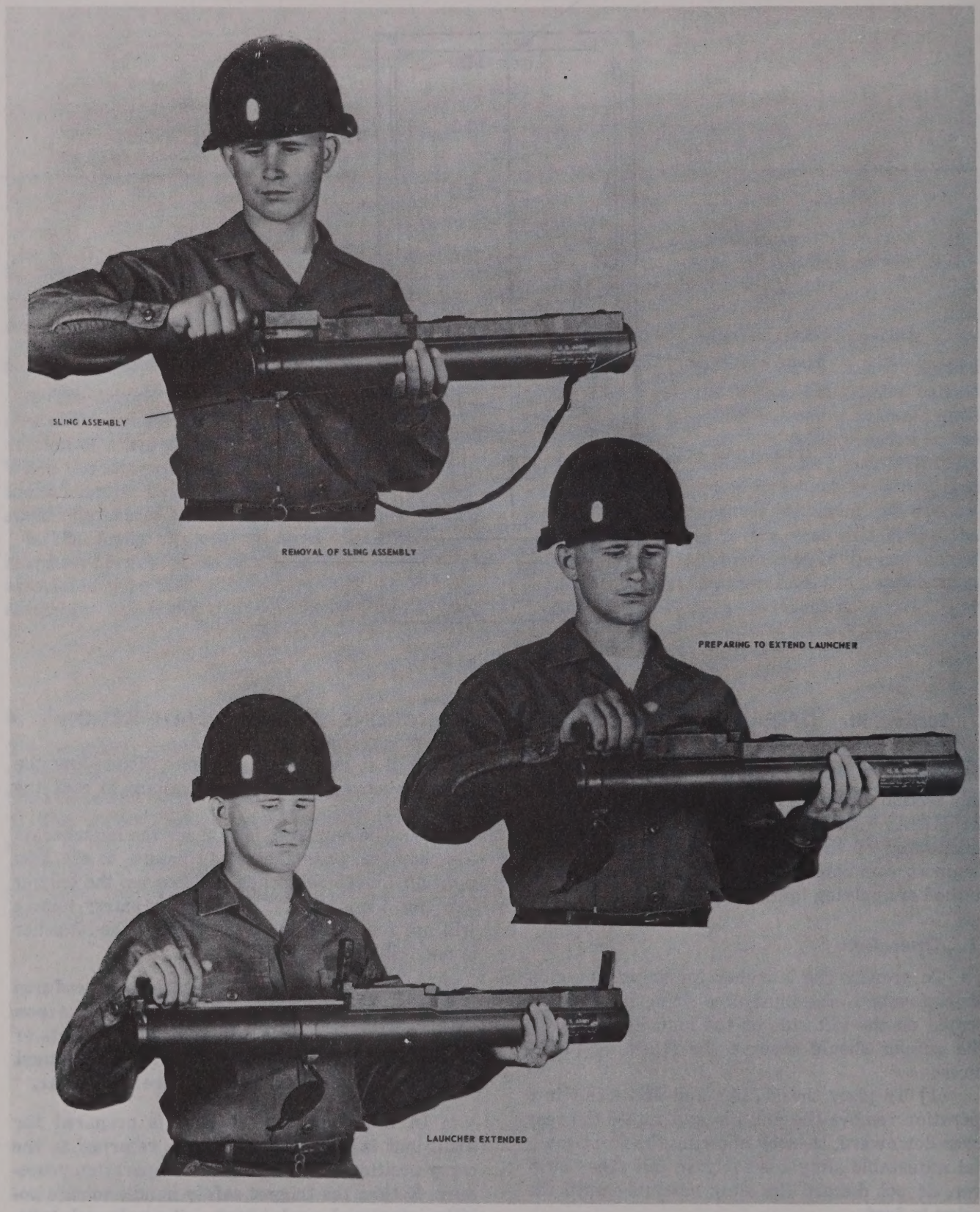


Figure 5. Extending the rocket launcher.

Figure 6. Moving safety handle to ARM position and aiming weapon.

Figure 7. Carry positions.

turned to its original state it is no longer watertight; however, the rocket and rocket motor ignition system are watertight and are virtually unaffected by water.

c. The launcher can be transported by utilizing the adjustable sling. The sling should be adjusted to fit the individual comfortably. It should be slung with the muzzle or forward end down (fig 7).

12. Functioning of the Launcher

Once the M72A1, or M72A1E1, has been prepared for firing and the trigger depressed, the firing pin rod assembly is released. The firing pin rod spring drives the firing pin rod to the rear and into the primer. The primer ignites a black powder in the flash tube, which initiates the integral igniter of the rocket motor. The igniter activates the propellant in the rocket motor.

13. Malfunctions and Immediate Action

The most common malfunctions that occur with the M72A1 and M72A1E1 (and M72) are the misfire and the hangfire.

a. Misfire. A misfire is a complete failure to fire, which may be due to a faulty firing mechanism or a faulty element in the propelling charge explosive train. A misfire is not dangerous, but since it cannot be immediately distinguished from a delay in the functioning of the firing mechanism or from a hangfire (*b* below), it should be considered as a possible delay firing, until such a possibility has been eliminated.

b. Hangfire. A hangfire is a delay in the functioning of the propelling charge explosive train at the time of firing. The amount of delay is unpredictable, but in most cases will fall within the range of a split second to several minutes. Therefore, a hangfire cannot be distinguished immediately from a misfire.

c. Misfire Procedures. After failure to fire resqueeze the trigger. If the round does not fire, wait 10 seconds. Keeping the launcher trained on target, place the trigger safety handle on the SAFE position and remove the launcher from the shoulder. Once the launcher is removed from the shoulder, wait 1 minute, depress the detent, and collapse the launcher approximately 4 inches. Grasp the rear sight cover and re-extend the launcher. (The launcher is automatically cocked when re-extended.) Place the launcher on the shoulder, pull the safety handle to ARM position, aim, and squeeze the trigger. If the weapon still does not fire, wait 10 seconds before returning the trigger safety handle to the safe position. Keep the weapon trained on the target area at least 1 minute; *but do not collapse* the launcher. Discard the launcher in accordance with procedures prescribed in TM 9–1950 and AR 385–63, or the unit SOP.

CHAPTER 3
ROCKET AMMUNITION

14. General

The M72A1 and M72A1E1 (and M72) are issued as complete rockets (fig 8). The propelling charge is not adjustable and the rocket comes packed in the launcher as a unit. The rocket consists of a rocket head, a fuze, and a rocket motor which contains the propellant and its igniter. A nozzle and a fin assembly are rigidly attached to the rear of the motor. The fuze closure serves also as the coupling for the rocket head and motor. The only designated ammunition for the rocket is high explosive antitank (HEAT). The rocket is 20 inches long, weighs approximately 2¼ pounds, has a muzzle velocity of about 475 feet per second, and has an approximate maximum range of 1,000 meters.

a. High Explosive Antitank (HEAT) Rocket. The 66-mm HEAT rocket warhead, M18, (fig 8) consists of a tapered, thin-gauge steel body. It is cylindrically shaped and contains a shaped charge composed of two-thirds of a pound of octol explosive held in place by a thin copper cone. When detonated, the force and heat of this explosive is focused by the copper cone, forming a small but powerful jet. The forward end of the head, called the ogive, is made of thin metal and is hollow. The ogive holds the shaped charge at the required distance from the target to obtain the maximum effect of the jet. This distance is called standoff. The jet penetrates the target and, in the case of armor, causes particles to be knocked off the inside surface. If the jet hits the engine or the ammunition storage, it will start a fire or cause an explosion. (The M72A1E1 has a rocket with a modified warhead which gives greater penetrating capability.)

b. HEAT Rocket. The HEAT rocket is used primarily against armor. It can be used against secondary targets such as gun emplacements and pillboxes with excellent results. It can also be used against snipers or troops in the open.

15. Technical Characteristics

a. Nose Cap Assembly. The nose cap assembly (fig 8) contains the piezo-electric element which is crushed on impact with the target. When the piezo-electric element is crushed, a small amount of electric energy is developed and transmitted through the lead wire to the fuze. This current initiates the firing train starting at the electrical detonator.

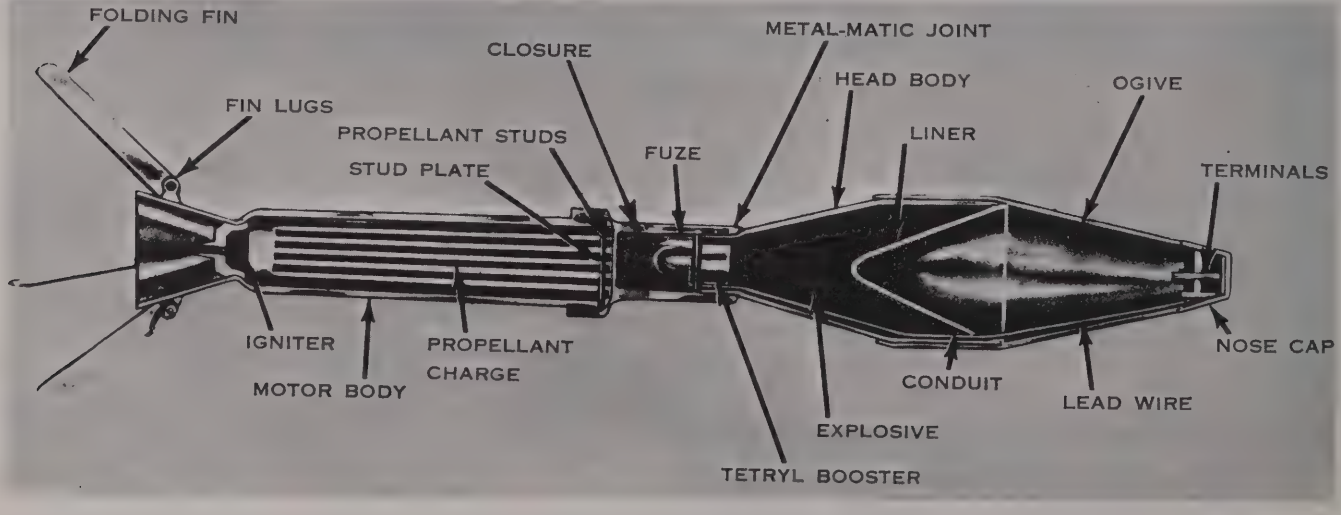


Figure 8. The 66-mm HEAT rocket.

b. Rocket Motor Ignition System. The rocket motor ignition system (fig 9) for the M72A1/M72A1E1 is composed of the following elements: firing pin housing, firing pin rod and firing pin rod spring, M29A1 percussion primer, primer block with black powder flash charge, flash tube, and black powder igniter. The following sequence takes place as the unit is cocked and fixed: The firing pin rod spring is compressed as the inner tube is extended and locked into position (fig 9). When the trigger is actuated, the firing pin rod is released and strikes the center of the M29A1 primer with sufficient force to detonate the primer. The flash from the primer ignites the flash charge located directly behind the primer in the primer block. The ignited black powder generates a flash or flame which travels within the plastic flash tube to the igniter. The flame is dispersed within the igniter body through radial holes in the flash tube extension, igniting the black powder charge in the igniter. The thin plastic film which seals the front surface of the igniter is burned away, allowing the flame front to progress to the propellant and ignite it. The igniter remains in the rocket nozzle until the pressure reaches several hundred pounds per square inch. This pressure level assures that the propellant is ignited and that combustion is stabilized. Further increase in pressure blows out the igniter body, and the rocket will start to accelerate. The time required for this sequence of events is about 40 milliseconds between the time the trigger is squeezed and the launching of the rocket. (For the M72A1 and M72A1E1, the firing pin rod assembly functions the same as the firing pin cable and the firing pin on the M72.)

c. Rocket Propulsion. The rocket is propelled by a discharging jet of hot gas generated by the burning propellant. The basic principle of rocket propulsion may be described as follows: In the case of a rocket motor, the gas pressure is built up by the burning propellant within the motor. When an opening is made at one end of the chamber the pressure at the open end drops to near atmospheric level while the pressure on the closed end or

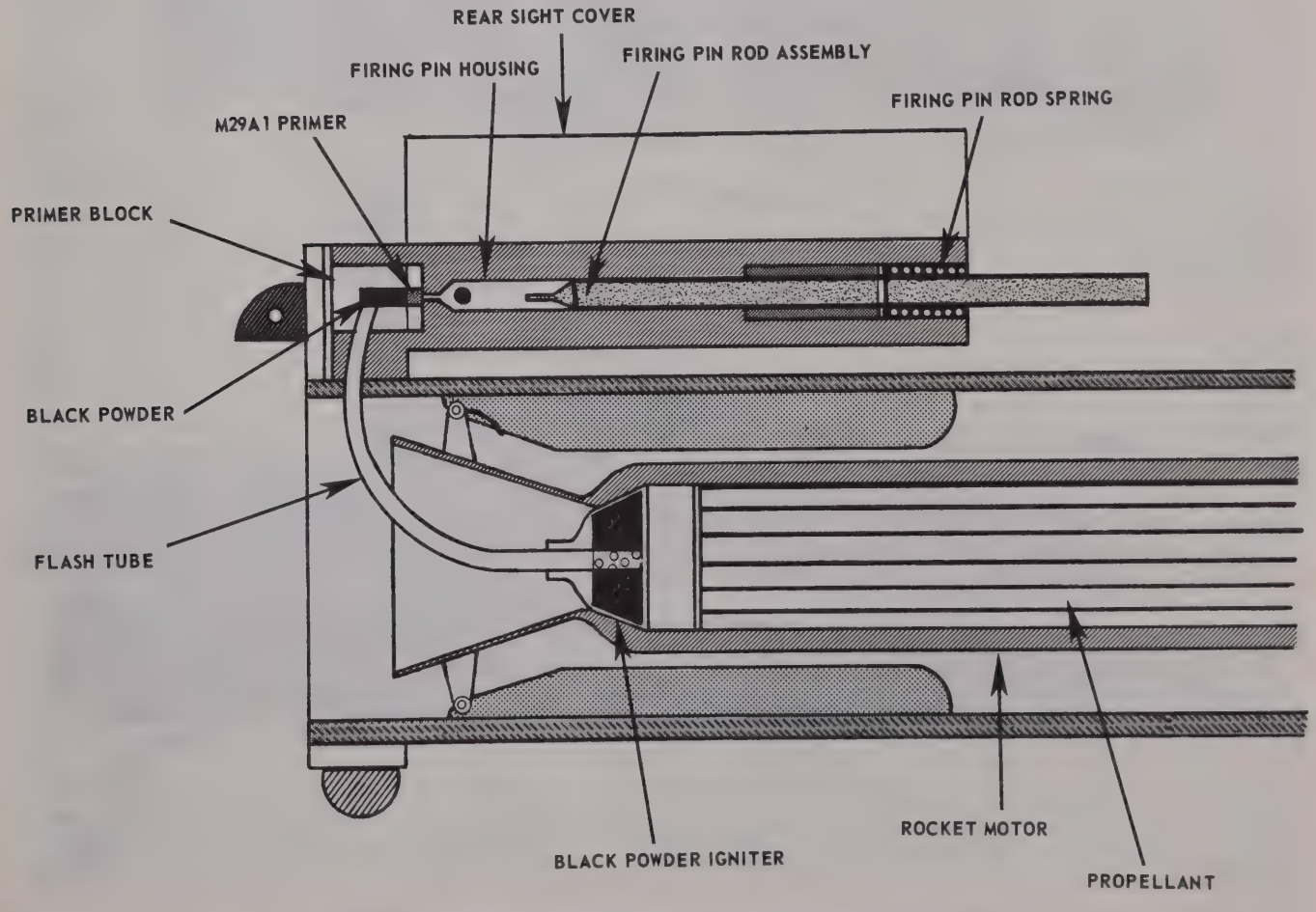


Figure 9. Rocket motor ignition system.

surface remains momentarily much greater than the normal atmospheric pressure. As a result of this unbalanced pressure within the rocket motor the rocket starts to move in the direction of the closed end as a stream or jet of gas is exhausted from the open end or nozzle. The speed and the quantity of the gases escaping to the rear determine the speed of the rocket. Pressure within the rocket motor will be maintained until the propellant is completely burned and, therefore, the rocket will accelerate until the burning of the propellant is completed. The total burning time is controlled by the propellant type and size.

d. Fuze. The M412 fuze is drop-safe and boresafe. The minimum arming distance is approxi-

Figure 10. Identification label (top); firing instructions (bottom).

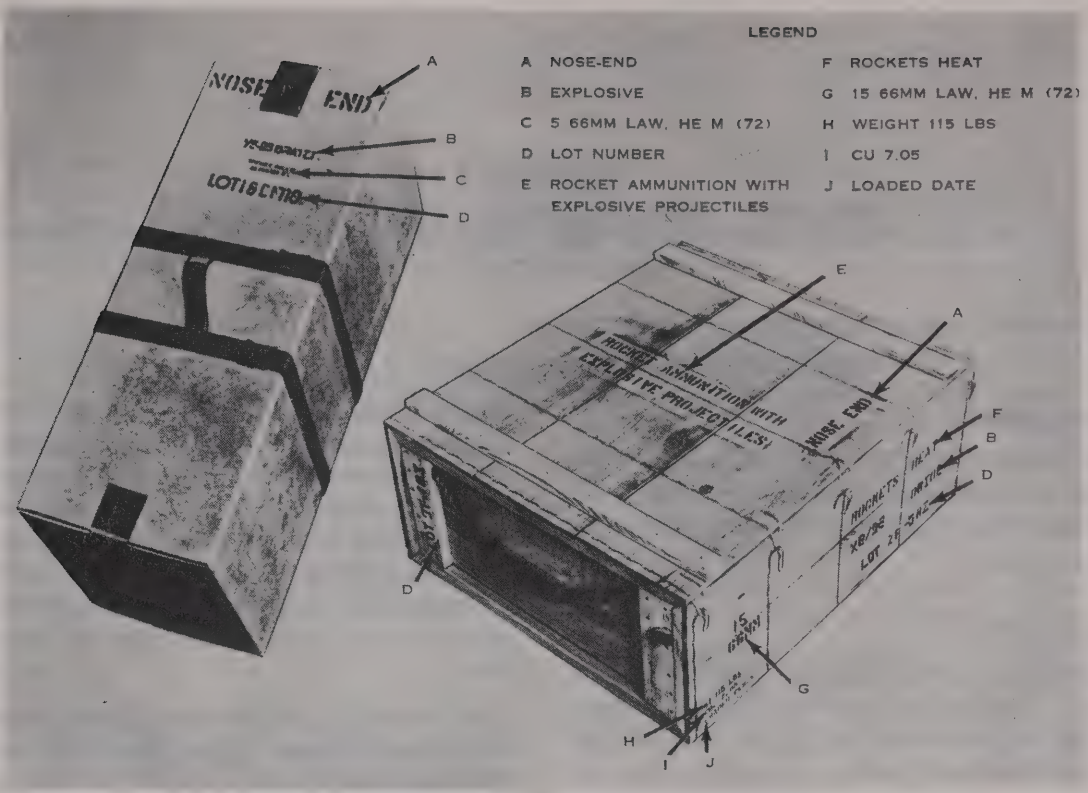


Figure 11. Packaging and shipping containers.

mately 30 feet. For graze functioning of the fuze, there is a spring-loaded firing pin which is released by decelerating force of graze impact. This fires a stab sensitive primer located adjacent to the detonator. This action, in turn, activates the explosive train which explodes the warhead.

e. Fin Assembly. Six holding fin attachment lugs are attached as an integral part of the motor. These fins are actuated by springs. As the rocket clears the launcher, the fins spring out and stabilize the rocket in flight (fig 8).

16. Identification of Rocket and Launcher

The rocket and launcher are identified as to type by color and marking (fig 10). The color scheme is as follows:

Type and marking	*Components*
HEAT rocket; black in color, stenciled in yellow.	Rocket, live percussion primer, live motor, live fuze with booster, and live warhead M18.

17. Packaging

Five complete systems (units) are packaged in a fiberboard inner pack, and three inner packs in a wirebound, wooden outer pack. The inner pack with end pads and five units weighs 27½ pounds and the gross weight of the outer pack with 15 units weighs 120 pounds. The inner and outer boxes are marked as shown in figure 11.

CHAPTER 4

M72A1, M72A1E1, (M72): MAINTENANCE AND INSPECTIONS, DECONTAMINATION, DESTRUCTION

Section I. MAINTENANCE AND INSPECTIONS

18. Maintenance

The M72A1 and M72A1E1 (and M72) require no preventive maintenance or repairs at first or second echelon. No repair parts are supplied to the using organization.

19. Inspections

Because the M72A1 and M72A1E1 (and M72) are issued as an item of ammunition rather than a weapon, inspections should be limited to visual examinations of the sealed unit.

a. The M72A1 and M72A1E1 (and M72) should be examined to insure that all of the seals are intact and that the tube has not been cracked, punctured, or crushed. The rubber boots covering the trigger bar and the detent should not be torn or punctured and the sling should be serviceable. Since the M72A1 and M72A1E1 (and M72) are waterproofed at the time of issue, the launcher should not be extended until the unit is ready to be fired.

b. The pull pin and the trigger safety handle should be in place. The exposed portions of both front and rear sights should also be examined to detect possible damage.

Section II. DECONTAMINATION

20. Procedures

If the M72A1, M72A1E1, (M72) become contaminated, decontamination personnel should use a complete set of protective clothing (permeable or impermeable) including impermeable protective gloves and a protective mask.

21. Types of Contamination

a. If contamination occurs with chemicals other than the blister agents, G-series or V-agents, decontamination can be accomplished by airing or washing the contaminated areas.

b. If the source of contamination is a blister agent, G-series or V-agent, the affected areas should be cleaned of all dirt, grease, or oil, and scrubbed with soap and water or cleansed with noncorrosive decontaminating agent DS–2. For more complete information on decontaminating consult FM 21–40.

Section III. DESTRUCTION

22. General

a. When capture of the M72A1, M72A1E1, (M72) is imminent or if it becomes necessary to abandon the system in a combat zone, the unit commander, in accordance with instructions from higher command, may order its destruction.

b. Adequate destruction requires that all parts essential to the operation of the system be destroyed or damaged beyond repair. Priority is given, however, to the destruction of those parts most difficult to replace, such as the sight, firing mechanism, and launching tube. It is important that the same parts of all systems be destroyed so the enemy cannot construct one complete unit from several damaged ones.

c. Any time the unit is fired, in a tactical situation, the launcher should be destroyed.

23. Destruction

Destruction can be accomplished by any one of four methods (TM 9–1340–214–12).

a. Burning.

b. Demolition.

c. Gunfire.

d. Crushing.

CHAPTER 5
PREPARATORY MARKSMANSHIP TRAINING

24. General

Preparatory marksmanship exercises are designed to train gunners in the essentials of good marksmanship and develop the correct habits necessary to become good marksmen before range firing begins. There are four areas in which a gunner should become proficient before firing for familiarization. These areas are aiming, trigger squeeze, immediate action, and positions.

25. Aiming

a. Rear Sight. The rear sight on the M72A1, M72A1E1, (M72) is basically a simple peepsight. The gunner sights through the rear sight by placing his eye on line with the peephole and sighting toward the front sight reticle.

b. Front Sight Reticle Pattern. The M72A1/M72A1E1 sight reticle has a vertical range line with ranges from 50 to 350 meters in 25-meter increments, two curved stadia lines to aid the gunner in range estimation, and lead index marks representing 15 miles per hour of target speed (fig 4).

c. Use of Sights. In general, to sight the launcher the gunner must first estimate the range to the target with the stadia lines. Once the range is estimated, the gunner places the launcher in position on his shoulder so that his eye is close to, and in line with, the peephole in the rear sight. The gunner looks through the peephole at the sight reticle and places the target on the range line corresponding *to the estimated range* to the target. Using the sight on the M72A1/M72A1E1 is the same as with the M72 except that stadia lines have been added to aid the gunner in estimating range to targets of known dimensions; e.g., a tank, or a truck. Examples describing specific rules for aiming follow:

(1) *Stationary target.* To engage a stationary target the gunner estimates the range to the target, finds this range on the vertical range line, and places that point on the target's center of mass (fig 12).

(2) *Targets moving directly toward or away from the gunner.* The gunner must use a half stadia sight picture to estimate the range to the target, locate this range on the vertical range line (fig 13), and place this point so the range segment is on the target center of mass. If the target is moving directly away from the gunner, the procedure would be the same.

(3) *Targets moving directly across the gunner's front.* With a target moving perpendicular to the gunner's line of sight, the gunner must estimate the range to the target and the speed the target is moving. The sight reticle should be placed on the target so that the vertical range line is always in front of the target's direction of travel. With the correct range marking lined up on the target, the rocket launcher must be moved horizontally in the direction of the target's movement so that the *lead cross* opposite the range is lined up on the forward section of the target (fig 14). With this *line of aim,* and the target moving at 15 miles per hour at a distance less than 200 meters, the rocket should strike the rear third of the target. If the target is at a distance greater than 200 meters the gunner estimates additional lead. The lead marks on the M72 sight reticle indicate 15 miles per hour of speed. If the gunner estimates the target's speed as less than 15 miles per hour he must interpolate the amount of lead necessary to engage the target by visualizing a point on the reticle (fig 15).

(4) *Targets moving at an angle toward or away from the gunner.* When the target is moving toward the gunner at an angle where more of the front of the target is visible than the side, the gunner should estimate the range to the target and place that range on the forward edge of the target (fig 16). If the target is moving at an angle where more of the side is visible than the front the gunner would estimate the range, estimate the speed it appears to be moving, and apply one-half lead to the forward edge of the target (fig 17).

26. Trigger Squeeze

The trigger is unique in that it is a bar located on

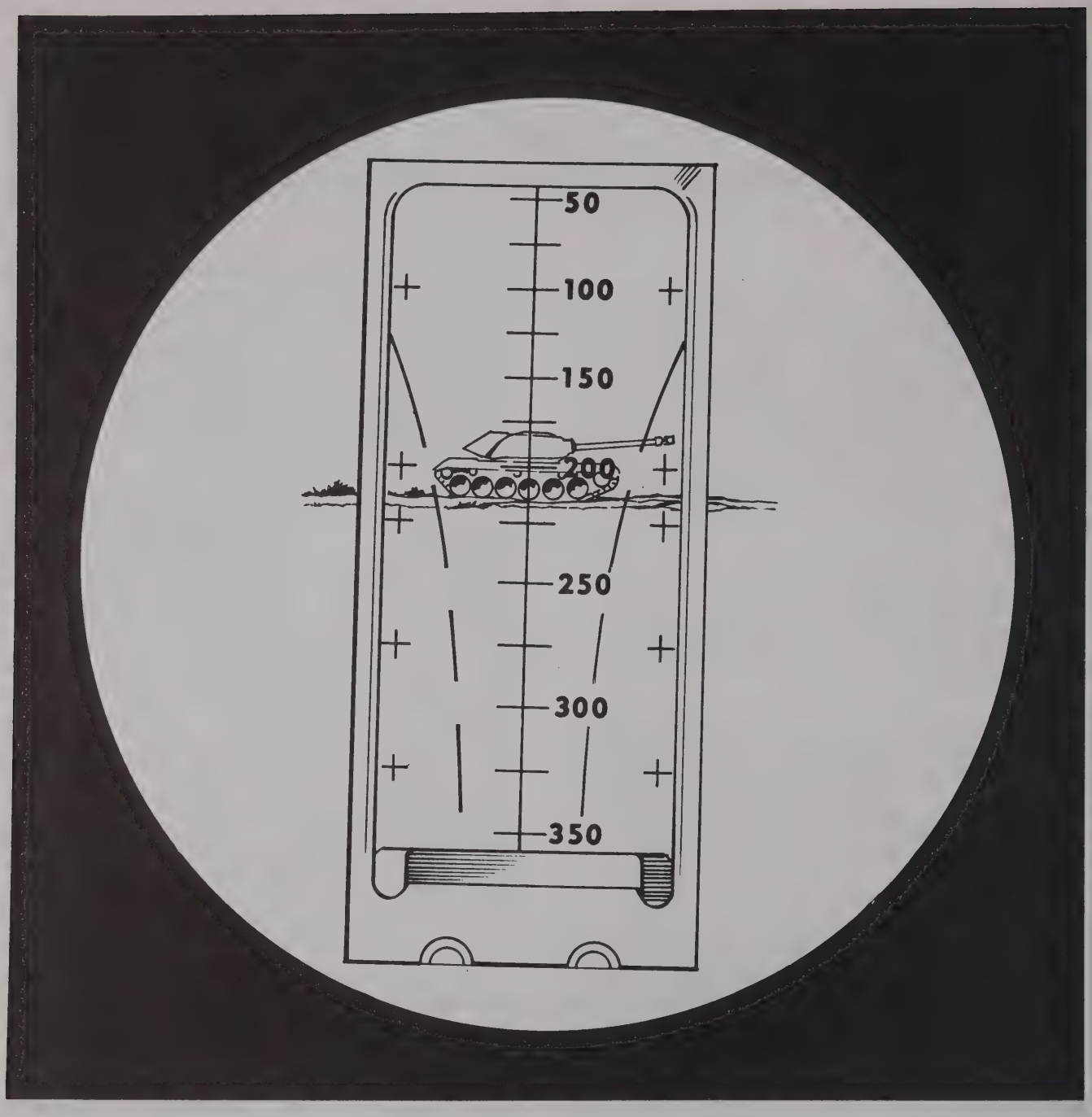


Figure 12. Front sight: using stadia lines for range estimation (side view at 200 meters).

the top of the launcher. To fire, pressure must be applied straight down. The thumb may be placed under the launcher or alongside the tube depending upon the size of the gunner's hand, and whichever is more comfortable. The gunner should apply a steady, smooth squeeze downward with finger tips only.

27. Immediate Action

The gunner should be familiar with the procedure for applying immediate action before he is allowed to fire. The only time immediate action need be applied is in the event of a malfunction. The detailed steps of immediate action are found in paragraph 13.

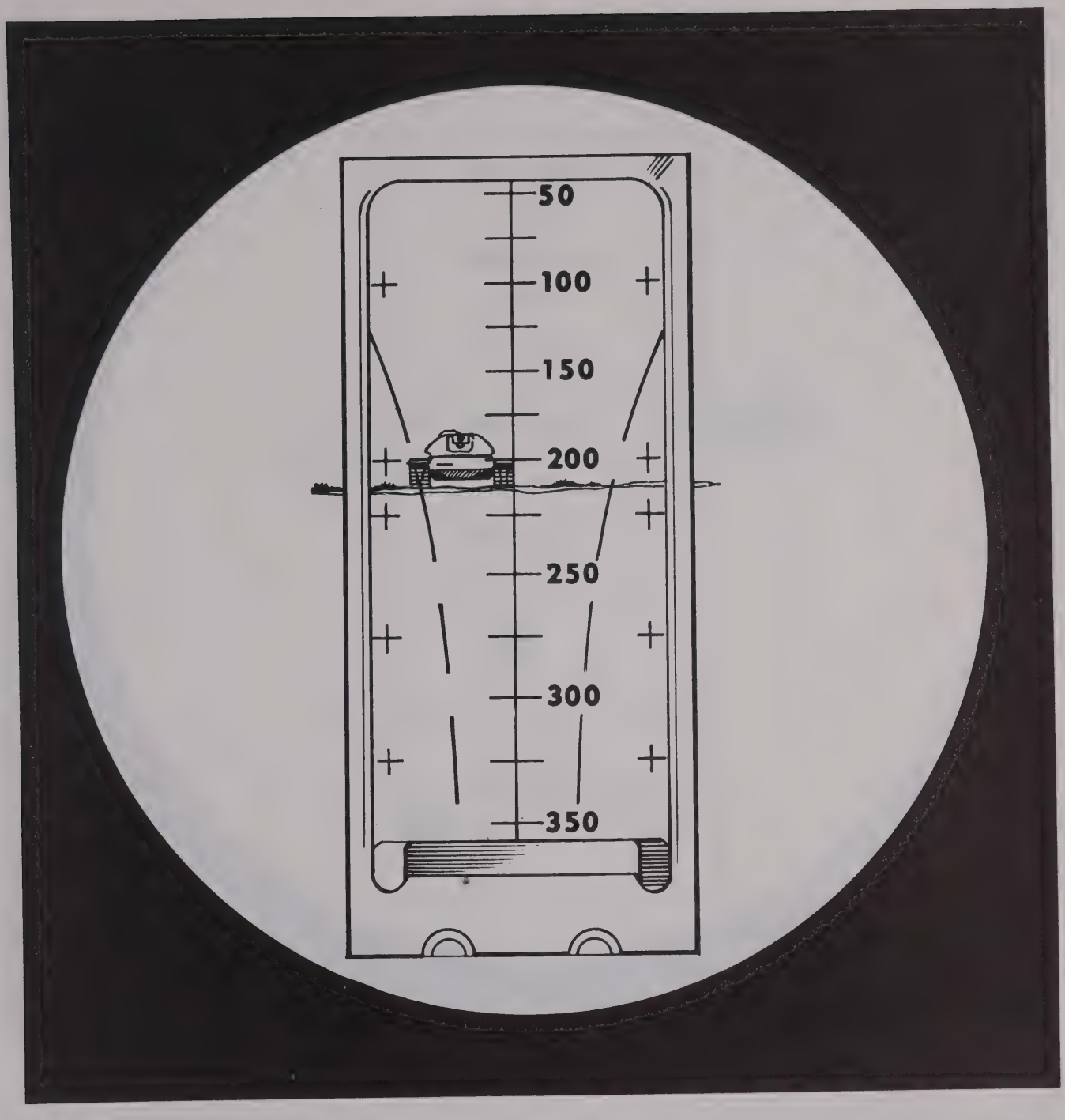


Figure 18. Front sight: using stadia lines for range estimation (head-on at 200 meters).

28. Positions

The M72A1, M72A1E1, (M72) may be fired from the right or left shoulder in the standing, kneeling, modified kneeling, sitting, or prone positions. The exact positions may vary slightly to allow for the configuration of the individual's body. The gunner must insure that his position is stable and comfortable and that it is the most suitable one for engaging the target. In general, the most suitable positions for engaging a moving target are standing and modified kneeling. All of the positions are suitable for stationary targets. Situation, terrain, and gunner preference should govern the selection of the best position. Whenever possible,

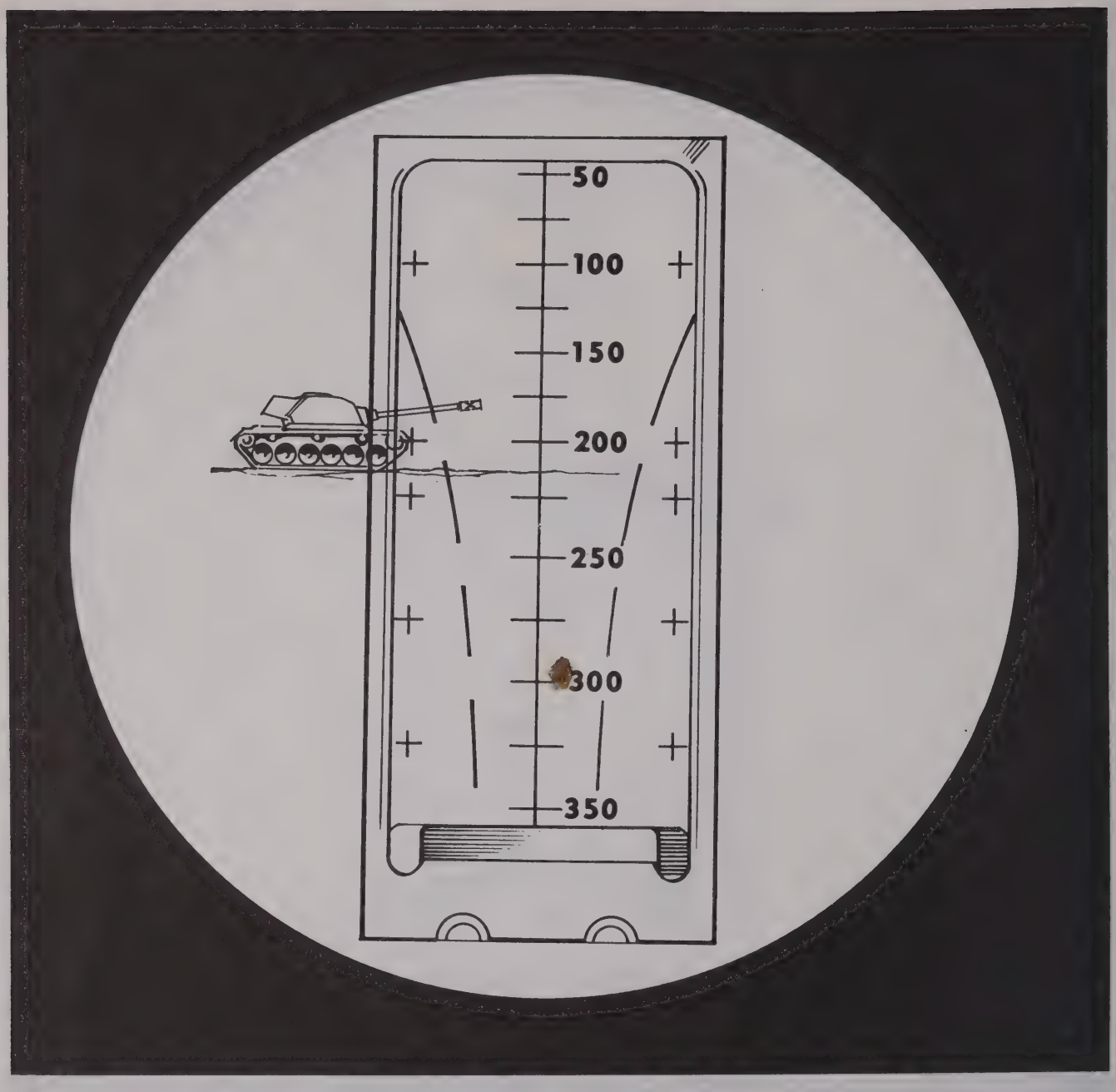


Figure 14. Target moving left to right, 15 m.p.h., at 200 meters.

gunners should employ the following positions with support, as the inherent stability of a supported position aids the gunner when aiming. If a gunner is left-handed the procedures used for positions should be reversed.

a. Standing Position. The standing position (fig 18) is similar to the standing position for firing a rifle. Face the target, execute a half-right face, spread the feet a comfortable distance apart, and place the launcher on the shoulder; the body should be well-balanced with the hips level. The left hand should be directly under the forward portion of the launcher. The right elbow should be placed against the body for stability. To traverse in this position, move the body from the ankles up.

b. Kneeling Position. There are two satisfactory kneeling positions. The first position described (fig 19) is preferable for tracking moving targets. To assume the kneeling position for engaging moving targets, face the target, execute a half-right face, and kneel on the right knee with the upper part of the right leg vertical. Point the left leg toward the

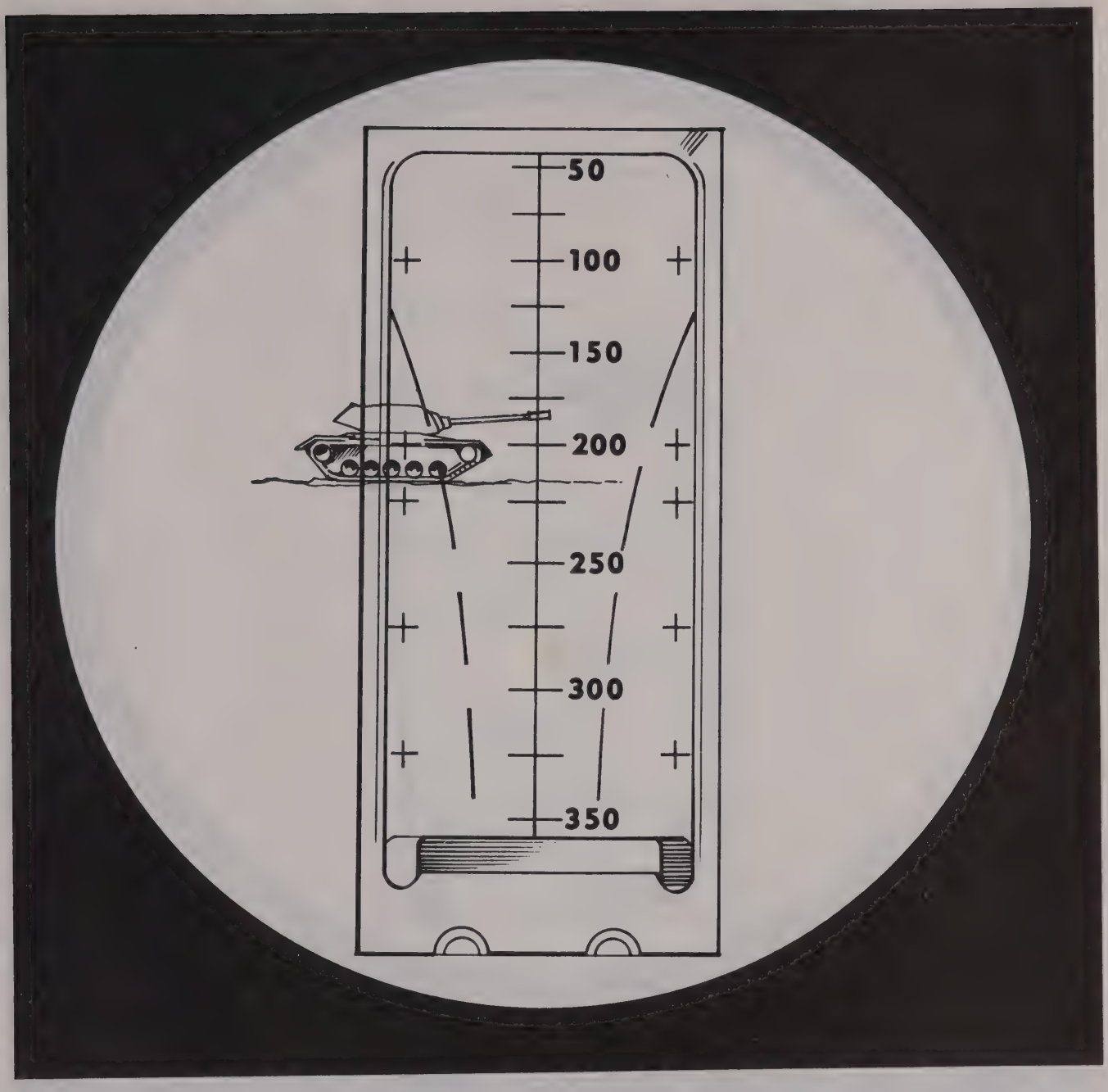


Figure 15. Target moving left to right, 10 m.p.h., at 200 meters.

target with the left foot at a right angle to and opposite the right knee. The left leg forms a right angle to the ground. Hold the body erect with the left elbow under the launcher and the right elbow against the side. The second kneeling position (fig 20) is similar to the kneeling position for firing the rifle. Kneel on the right knee with the right thigh at a 90 degree angle with the line of aim and sit back on the right heel, shifting the weight forward. As viewed from the front, the left leg is vertical. It need not appear vertical, however, when viewed from the side. Rest the upper left arm forward of the left knee and the right arm against the body. Either position may be used when firing at stationary or moving targets; however, the first kneeling position allows easier traverse.

c. Sitting Position. There are two satisfactory sitting positions. In the first position (fig 21), the gunner will face the target, execute a half-right face, sit with legs crossed, lean slightly forward

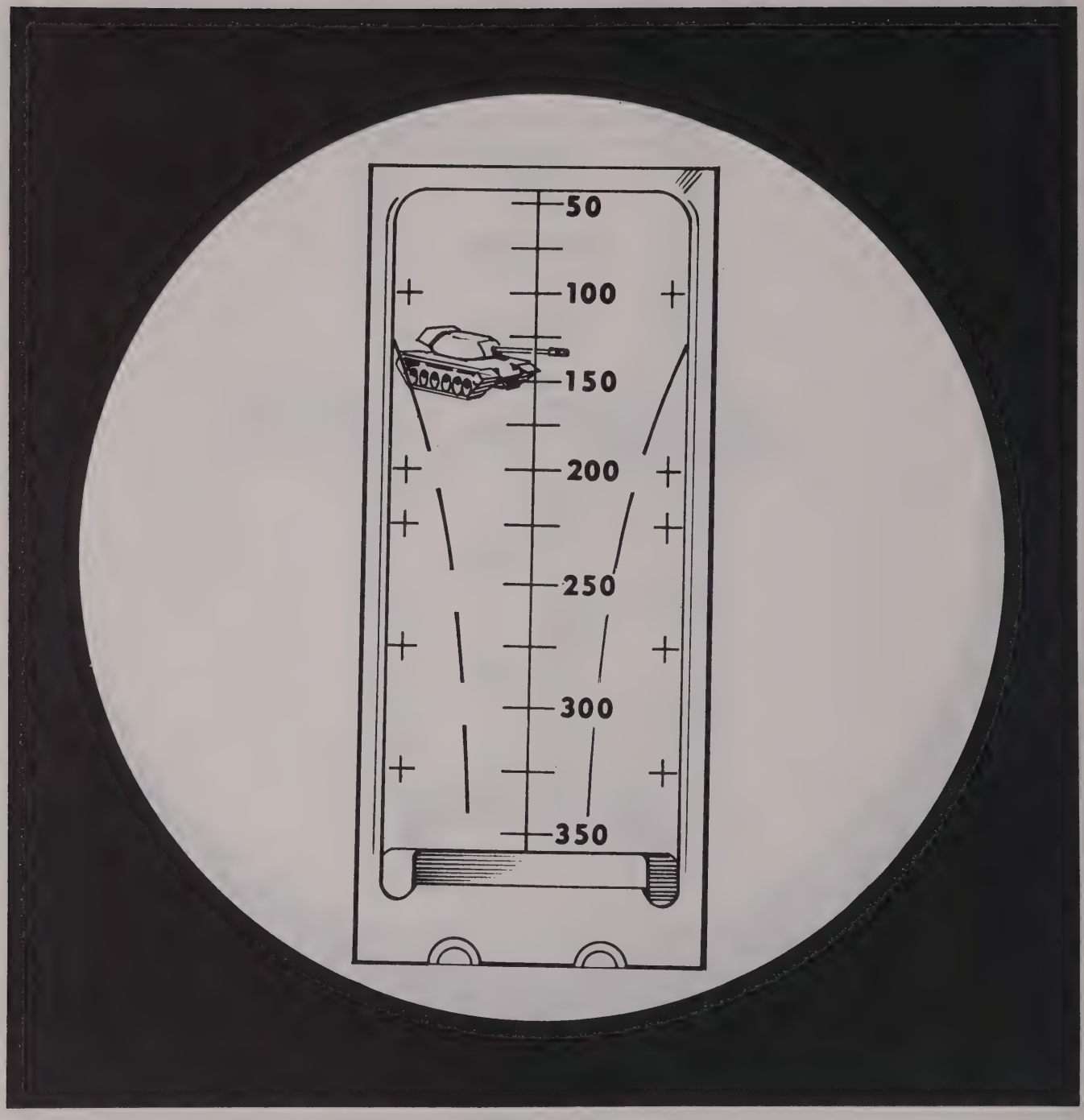


Figure 16. Target moving toward gunner, 150 meters, at an angle of 45 degrees or less.

from the hips, and rest the elbows forward of the knees to avoid bone-to-bone contact.

Caution: **Be sure no portion of body is in back-blast area.**

Place the right hand on the trigger and grasp the forward section of the tube with the left hand. To assume the alternate position (fig 22), face the target, execute a half-right face, and sit with the legs partially extended and well apart. Brace by digging the heels into the ground in the conventional rifle position. Rest the elbows forward of the knees to avoid bone-to-bone contact. The sitting position is suitable for firing at stationary targets and is more stable than the kneeling position.

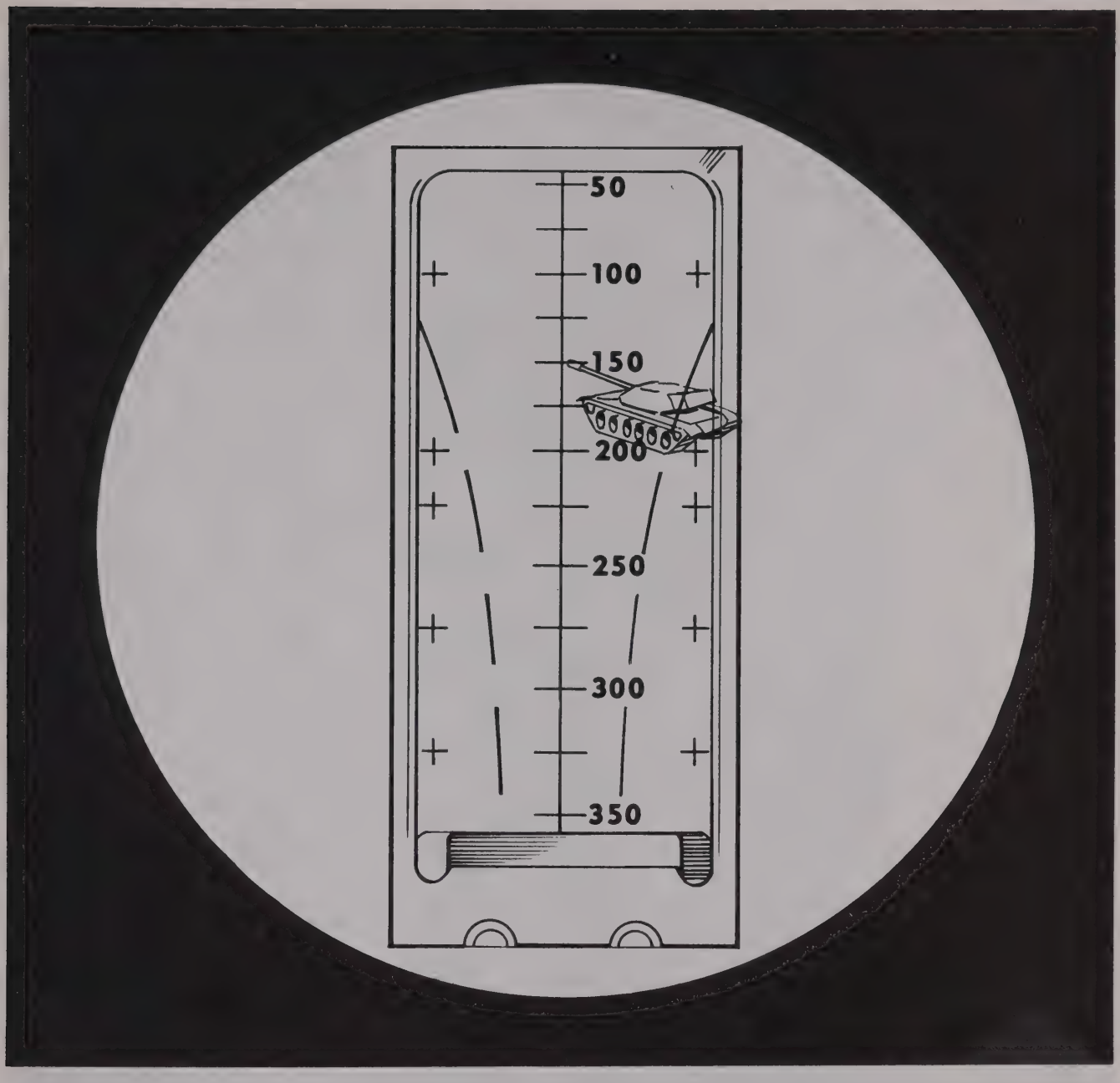


Figure 17. Target moving away from gunner, 175 meters, at an angle of 45 degrees.

d. Prone Position. To assume the prone position (fig 23) lie down at an angle of not less than 45 degrees to the line of fire in order to keep clear of the backblast area. The back should be straight and the right leg directly on a line running through the right hip and right shoulder. Move the left leg as far as possible with comfort. Keep both heels on the ground. Hold both elbows well below the launcher. Hold the head as steady as possible with the right eye lined up with the sights. If an occasion which requires tracking a moving target should arise, maintain a 45 degree angle so the backblast is not directed at the feet and legs.

Figure 18. Standing position.

Figure 19. Modified kneeling position.

Figure 20. Kneeling position.

Figure 21. Sitting position.

Figure 22. Alternate sitting position.

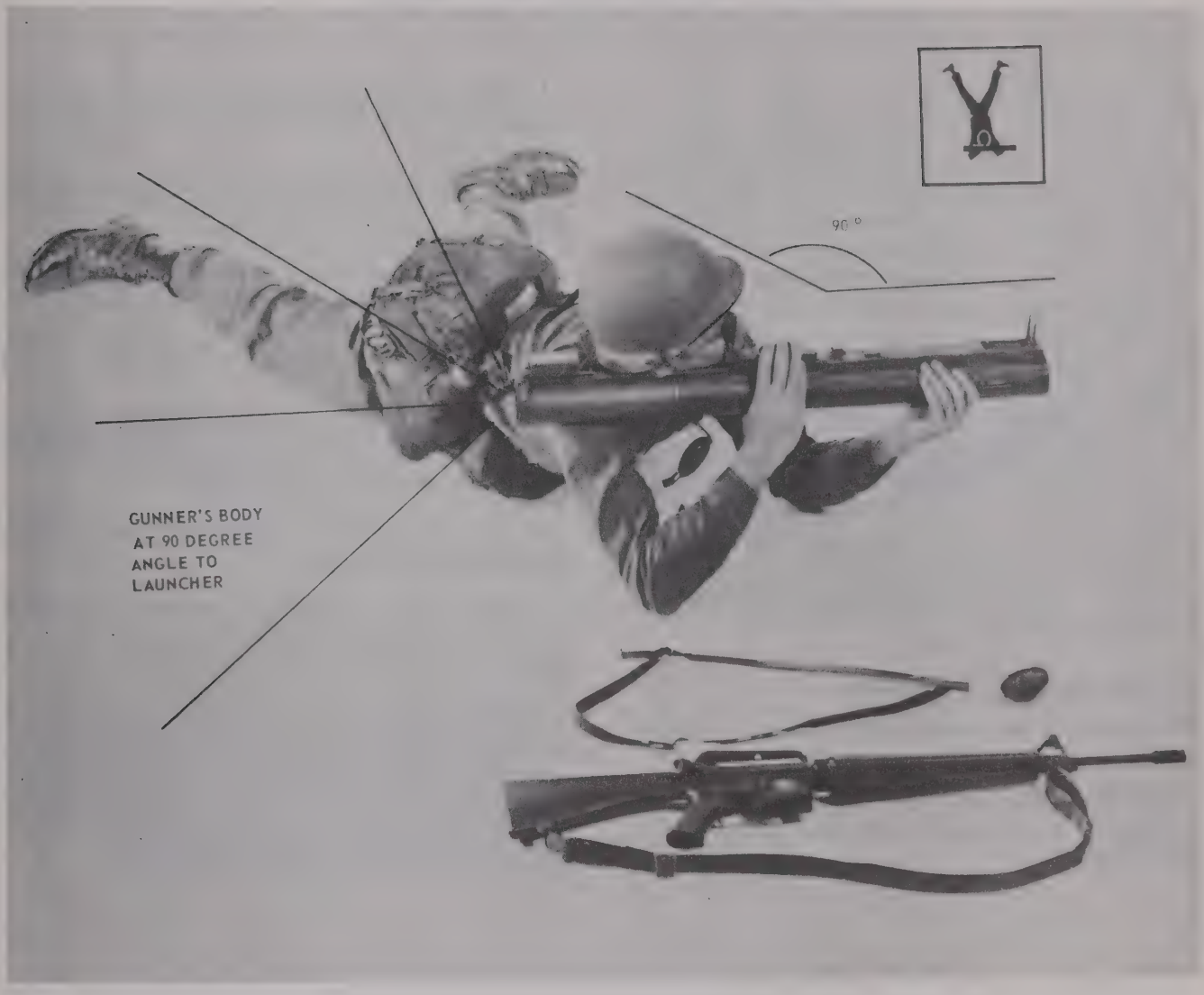


Figure 23. Prone position.

CHAPTER 6
RANGE PROCEDURES AND SAFETY

29. Backblast Area

The M72A1 and M72A1E1 (and M72) have no recoil because they are open chambered weapons. The propellent gases escape to the rear of the launcher and can cause severe injury to personnel and damage to equipment located within close proximity to the breech of the launcher. The total backblast area extends 40 meters to the rear of the launcher (fig 24). The danger zone extends 15 meters to the rear of the tube and has a base of 8 meters. All personnel, equipment, and flammable materials must be clear of this area. The caution zone extends an additional 25 meters beyond the danger zone and has a base of 25 meters. Personnel in this area could be injured from secondary missiles that are thrown to the rear by the blast. In a training situation the entire 40-meter area should be marked off and kept clear of all personnel and equipment.

30. Range Firing Procedures

The following precautions apply when firing the M72A1 and M72A1E1 (and M72):

a. Before firing, the entire backblast area must be clear of all personnel, equipment, and flammable material.

b. Range firing does not begin until the officer in charge knows the range is clear. He gives the command to fire.

c. At least one officer must be present during all firing.

d. No person moves to, or leaves, the firing line without the permission of the officer in charge.

e. The ready line is placed to the flank of the firing line.

f. No one passes into the area behind the firing line, and forward of the rear safety line, without permission of the officer in charge.

g. All munitions are covered to protect them from the rays of the sun.

h. The M72A1, M72A1E1, (M72) is not fired when temperatures exceed the operating limits of the munition (—40°F. to +140°F.).

i. To account for all duds when firing HEAT rockets, a noncommissioned officer is designated to count the number of rockets fired and the number of explosions. Range firing, and the destruction of duds, is conducted according to the provisions outlined in AR 385–63 and TM 9–1300–206.

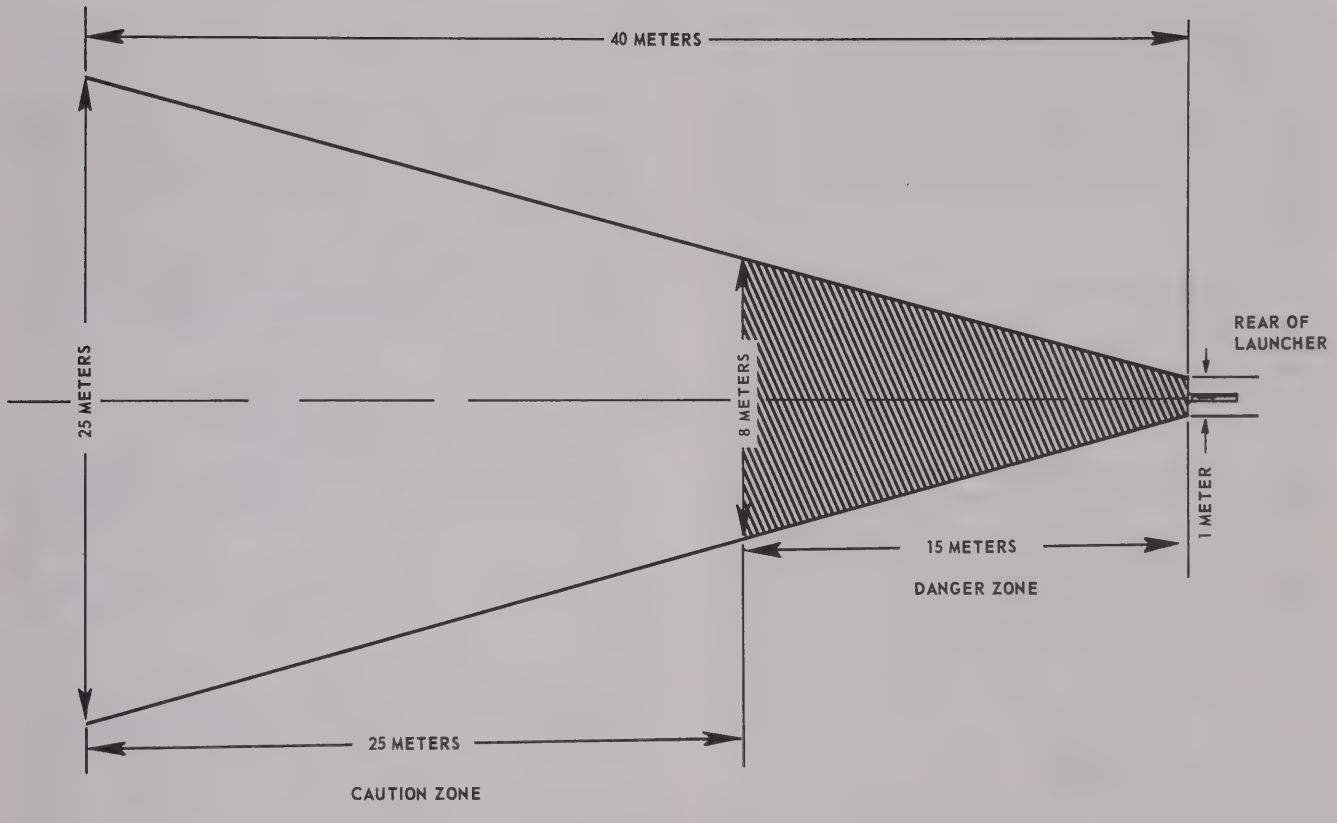


Figure 24. Backblast area.

CHAPTER 7
TECHNIQUE OF FIRE

31. General

Training in technique of fire teaches the gunner to place effective fire on the target. It should be given after preparatory marksmanship training, but prior to range firing. This training includes range estimation, speed estimation, and target vulnerability.

32. Range Estimation

With the M72A1/M72A1E1 the maximum range at which targets can be engaged using the sight is 350 meters; therefore, range estimation exercises need only go as far as 350 meters. In making range estimates the emphasis should be placed on speed and accuracy. Training should begin with stationary targets and gradually progress to moving targets as the gunner's proficiency increases. With M72 the maximum range at which a target can be engaged with the sight is 325 meters. For principles and procedures of range estimation see FM 23–71.

33. Speed Estimation

a. The 66-mm HEAT rocket, M72A1, M72A1E1, (M72), was designed primarily for use against tanks and other armored vehicles. Normally, these targets are in motion and accurate engagement depends upon the gunner's ability to estimate speed as well as range.

b. The ability to estimate speed is developed in approximately the same manner as estimating range; that is, *by constant practice.* The trainee should begin by estimating speed at known ranges and constant direction. The types of vehicles should be varied. As the gunner improves, the ranges, directions, and type of vehicles can be varied at the same time. (Tanks should be used whenever possible.)

34. The Vulnerability of Armor

a. A tank, without the protection afforded by dismounted infantry, is vulnerable to a close-in attack by well-armed infantry units. When buttoned up, the visibility of the tank crew is restricted. These "blind spots" can be used effectively as avenues of approach for tank killer teams.

b. The tank usually has its heaviest armor located on the front slopes. By comparison, the rear, sides, and bottom have much less armor protection. A gunner should attempt to engage a tank from the side whenever possible. The side offers the largest possible target area and less armor protection. The gunner should always attempt to obtain a center-of-mass hit.

CHAPTER 8
TACTICAL EMPLOYMENT

35. General

The M72A1, M72A1E1, (M72) is issued as a munition rather than as an individual weapon, and is carried and employed by the soldier in addition to his basic combat arm. Basic loads for the M72A1, M72A1E1, (M72) are assigned to each unit as with other types of ammunition. Individuals assigned to units authorized a basic load should be trained in the use of this weapon (app C). It supplements other organic antitank weapons, and provides the primary means of antitank protection for the rifle squad and other units or installations not having organic antitank weapons. It may be employed in the offense by assault elements, or in the defense by any combat or noncombat element of the Army.

36. Offensive Actions

In the attack, light antitank weapons should be readily available to influence the action where necessary. Due to their relatively short range, they should be interspersed throughout the maneuver element. As the weapon is designed to be employed by an individual, the firer must look to the rear before firing to insure backblast clearance. Light antitank weapons are employed primarily against armored vehicles; they may also be employed against light vehicles, bunkers, pillboxes, or other crew-served weapon positions. They are particularly effective against built-up areas, fortified positions, or strong enemy defenses.

37. Defensive Actions

Light antitank weapons should be issued to personnel in such a manner as to be positioned laterally and in depth to cover the most likely avenues of armored approach. Lateral dispersion is necessary to increase the probability of obtaining oblique fire on enemy armor approaching the defensive position. Due to its one-shot capability, more than one should normally be assigned to those individuals designated to fire the weapon. Since riflemen may be issued the weapon to fire from their normal fighting positions, consideration must be given to the clearance of backblast areas in conjunction with the construction of positions. Although the M72A1, M72A1E1, (M72) is employed primarily against armor, it may also be employed against grouped or attacking personnel.

38. Specialized Actions

The ratio of destructive power in comparison with its light weight makes the M72A1, M72A1E1, (M72) an excellent weapon for combat patrols, ambush parties, and tank-killer teams. It can be effectively employed by raiding parties against such targets as command posts, communications installations, and supply dumps. The tank-killer team can operate in either an offensive or defensive action. In general, tank-killer teams should be employed during periods of limited visibility and in areas where cover, concealment, and withdrawal routes are readily available. As a minimum, the team should have a leader, a support element, and an antitank element. A four-man team provides the minimum number of personnel to accomplish this type of mission. Some areas which are suited for tank-killer operations include dense forests with only a few roads, natural defiles, terrain that canalizes enemy armor into a narrow front, and built-up areas such as towns or cities. Hit-and-run tactics should be used by tank-killer teams. Their mission is to destroy, delay, disorganize, and demoralize enemy armor formations before they can attack. Because of its lightweight and high penetrating power the M72A1, M72A1E1, (M72) is ideally suited for use by the tank-killer team.

APPENDIX A
TEXT REFERENCES AND TRAINING AIDS

1. Text References

a. Army Regulations (AR).

385–63 Regulations for Firing Ammunition for Training, Target Practice, and Combat.

b. Field Manuals (FM).

7–15 Rifle Platoons and Squads—Infantry, Airborne, and Mechanized.
21–5 Military Training Management.
21–6 Techniques of Military Instruction.
21–30 Military Symbols.
21–40 Chemical, Biological, Radiological and Nuclear Defense.
23–71 Rifle Marksmanship.

c. Technical Manuals (TM).

9–1300–206 Care, Handling, Preservation, and Destruction of Ammunition .
9–1340– Operator and Organizational
214–12 Maintenance Manual — 66-mm Light Antitank Weapon System M72 Series.
9–1950 Rockets.

2. Training Aids, Equipment, Facilities

a. Aids.

Training films (TF).

7–3421 Infantry Weapons Against Tanks (30 min).

b. Equipment.

Expended launchers.
Subcaliber training devices.
Subcaliber training ammunition.
Rocket/launcher weapons.
Public address system.

c. Facilities.

Classroom.
Training field (optional).
Familiarization range.

APPENDIX B
ADVICE TO INSTRUCTORS

1. Purpose

This appendix is a guide for instructors. Its contents should not limit their initiative and originality, provided they observe the necessary safety precautions.,

2. Method of Instruction

a. Instruction should be presented using explanation, demonstration, and application. The coach and pupil method is recognized as extremely effective.

b. Each man's training must be closely supervised to insure a high standard of proficiency and knowledge.

3. Training Objectives

The objective of training outlined herein is to train the light antitank weapon gunner to effectively employ the weapon in combat.

4. Assistant Instructors

Prior to instruction, train selected personnel as demonstrators and assistant instructors. Use at least one assistant instructor for each four men undergoing training. Assistant instructors must be able to correct errors and answer questions pertaining to the training. To give the students a clear picture of the work under discussion, make sure the demonstrators are trained and rehearsed thoroughly so demonstrations are correct in every detail.

5. General Training Notes

a. The minimum time required to train the gunner in the use of the weapon is 4 hours. This 4-hour block (app C) should be given in four successive hours rather than at four separate times. Training in tactics and techniques of employment should be covered during basic unit training.

b. The expended launcher is considered to be the most valuable training aid available for training with this system. Whenever possible, these launchers should be obtained and used throughout the course of instruction. Other training aids may be constructed using (as a guide) the photographs and diagrams contained within this manual. Regardless of whether the training aids are requisitioned or constructed, they should be available in sufficient time to assure that all assistant instructors are thoroughly familiar with them.

c. The instructor, demonstrators, and assistant instructors should be well-rehearsed and knowledgable on the weapon system(s). The instructor should make maximum use of explanation and demonstration. Practical exercises should be closely supervised to assure that the students do not develop poor habits. There should be at least one assistant instructor per four students during practical work. During live firing at least one safety noncommissioned officer per two students should be present, preferably one per student.

d. The amount of pressure required to depress the trigger to fire the weapon is great when compared with other infantry weapons; therefore, it is suggested that three fingers be placed on the trigger bar and that the pressure be applied to the tip of the bar. It should be noted that this trigger has a long squeeze and as a result there is a tendency for the gunner to anticipate the discharge of the rocket and flinch. Practice with expended launchers can be helpful in overcoming this tendency.

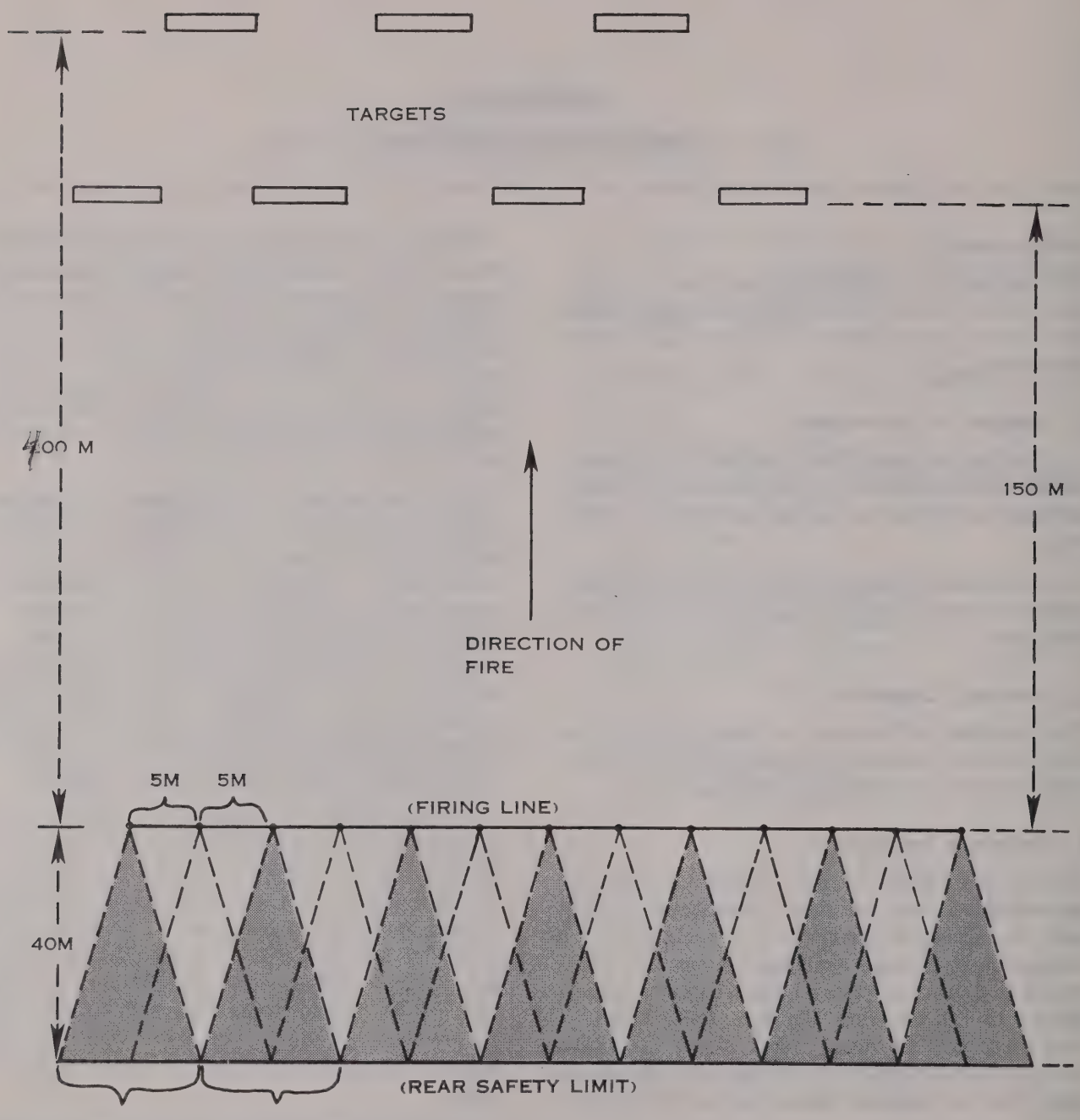
e. It is suggested that the kneeling position be used for familiarization firing to give the gunner maximum support and the range officer better control of the firing line.

6. Suggested Course of Training

For a suggested course of training see appendix C.

7. Suggested Range Layout

For a suggested firing range layout see figure 25.



Notes. 1. When firing, the safety NCO should be in position where he can influence the students movements at all times.

2. A 3.5-inch rocket range must have the following modifications for firing M72A1, M72A1E1, (M72).
   a. Range must be cleared for firing HEAT ammunition.
   b. Range fan and safety zones must be increased to accommodate increased range of M72A1, M72A1E1, (M72).
   c. Students should be placed on every other firing point when firing, in order to insure safety.
   d. No cross range firing should be allowed.
3. The first round should be fired at range of 150 meters.

Figure 25. Suggested training course.

APPENDIX C

TRAINING SCHEDULE

(Basic unit training)

1. Introduction

This appendix provides instruction to train personnel, *in all components of the Army,* to fire the M72A1, M72A1E1, and M72. (The schedule is designed as a continuation of 66-mm HEAT rocket instruction presented in Basic Combat Training (ASubjScd 23–74), and, it is essentially the same as 66-mm HEAT rocket instruction presented in infantry advanced individual training (ASubjScd 7–11B10, 7–11C10, 7–11H10).

2. 66-mm HEAT rocket, M72A1, M72A1E1, (M72) (4 Hr)

Period	Hours	Lesson	Text references	Area	Training aids and equipment
1	1	Introduction to the weapon to include characteristics, capabilities, functioning, and safety precautions.	FM 23–33	Classroom, or familiarization range.	Expended launcher; GTA 7–1–( ); public address system.
2	1	Preventive maintenance, and practical exercise in placing the launcher in and out of action and tracking moving targets.	do	Training field, or familiarization range.	One expended launcher per individual, public address system.
3	2	Safety precautions and familiarization firing.	do	Familiarization range.	Two live weapons per trainee. (Upon receipt of subcaliber devices, firing will consist of one modified launcher and five subcaliber rounds per trainee, plus one live weapon per trainee.) Public address system.

Note. Period 3 will be 3 hours upon receipt of subcaliber devices (app D).

3. 66-mm HEAT Rocket, M72A1, M72A1E1, (M72) (4 Hr)

a. Period 1. (1 Hr).

(1) *Lesson objective.* To teach the individual the characteristics, nomenclature, functioning, and capabilities of the weapon.

(2) *Lesson outline.*

(*a*) Introduction _____(2 min)

(*b*) Discuss characteristics, capabilities, and functioning of the weapon _____(10 min)

(*c*) Discuss preparatory marksmanship _____ (15 min)

(*d*) Discuss immediate action, recocking, and firing positions _____(10 min)

(*e*) Discuss safety precautions __(10 min)

(*f*) Summarize the lesson _____(3 min)

b. Period 2. (1 Hr).

(1) *Lesson objective.* To teach the individual how to—

(*a*) Prepare the weapon for firing.

(*b*) Take immediate action in case of a misfire.

(*c*) Recock and return it to the carrying position.

(*d*) Assume proper firing positions, get the proper sight pictures, and squeeze the trigger properly.

(*e*) Engage moving targets at various ranges and speeds.

(2) *Lesson outline.*

(*a*) Introduction _____(5 min)

(*b*) Demonstrate placing the weapon into operation, and immediate action and recocking procedures _____(5 min)

(*c*) Demonstrate the correct firing positions _____(4 min)

(*d*) Conduct practical exercise in assuming correct firing prositions _____(8 min)

(*e*) Discuss aiming and trigger squeeze _____ (4 min)

(*f*) Conduct practical exercise on aiming and trigger squeeze _____(38 min)

(*g*) Discuss range and speed estimation _____ (3 min)

(*h*) Conduct practical exercise on range estimation and tracking moving targets ___(8 min)

(*i*) Summarize the lesson _____(5 min)

c. Period 3. (2 Hr).

(1) *Lesson objective.* To teach the individual how to engage a stationary target.

(2) *Lesson outline.*

(*a*) Explain range procedures and safety precautions _____(10 min)

(*b*) Conduct familiarization firing as outlined in the table below _____(85 min)

(*c*) Summarize the lesson _____(5 min)

(3) Familiarization course.

(*a*) The course below will be conducted until the subcaliber device becomes available. The class will be divided into two groups with the first group going to the firing line. The use of time for the second group is at the discretion of the local commander. Groups will change as each completes firing.

Range	Number of rounds	Target	Position
150 meters _____	1	Dummy Tank (Stationary) _____	Standing.
200 meters _____	1	Dummy Tank (Stationary) _____	Kneeling.

(*b*) Period 3 will be increased to 3 hours upon receipt of the subcaliber device, with the additional hour being added to the conduct of familiarization firing. The firing will be conducted as indicated below.

Range	Number of rounds	Target	Position
150 meters _____	2 subcaliber _____	Tank (Stationary) _____	Sitting.
200 meters _____	1 subcaliber _____	Tank (Stationary) _____	Kneeling.
150 meters _____	2 subcaliber _____	Tank (Silhouette Moving) _____	Modified kneeling.
200 meters _____	1 HEAT _____	Tank (Stationary) _____	Kneeling.

APPENDIX D
SUBCALIBER DEVICE

1. Introduction

This device is being developed to enhance instruction on the 66-mm HEAT rocket by reducing the cost of training through the use of relatively inexpensive "training" rockets. The subcaliber system is briefly explained below. Upon completion of systems development appropriate training procedures will be incorporated in this manual.

2. Launcher

Only expended M72A1 or M72A1E1 launchers are adaptable to the trainer system. The launcher(s) is modified by removing its inner tube and replacing it with the XM190 subcaliber tube (fig 26).

3. Primer Block

The rear primer block of the expended launcher(s) is replaced by two studs and a rear primer housing door (fig 26) designed for ease of loading the system.

4. Projectile

The XM73 subcaliber projectile is an explosive 35-mm round that is detonated by percussion at point of impact. The primer cap and primer train are similar to those employed on the standard 66-mm HEAT rocket launcher system (fig 26).

Figure 26. Subcaliber system for 66-mm HEAT rocket training.

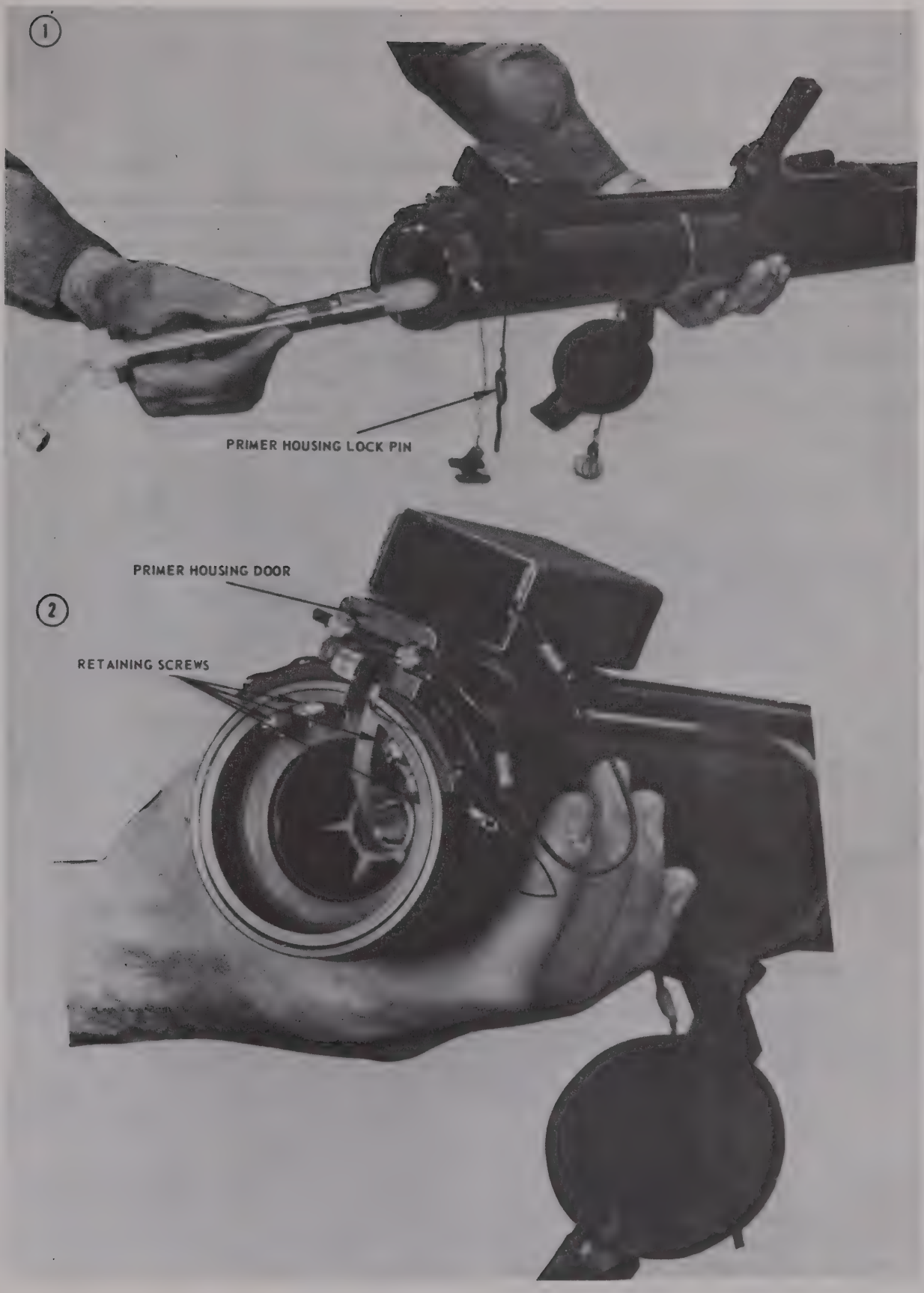


Figure 26.—Continued.

APPENDIX E
M72 CONFIGURATION

1. M72 Configuration

The original M72 configuration is no longer in production. The system is classified Standard B. However, there are M72's available. It varies from later models as described below.

2. Nomenclature

Reference figure 27.

3. Rear Sight

The rear sight (fig 28) consists of two stamped metal parts and a rubber boot. The fixed portion of the sight is marked with the words COLD and NORM indented on the bottom and it has two peepholes punched in it. The second piece has a small window in it and slides up and down on the fixed portion. The rubber boot is placed over the top portion of the sight to protect the gunner's eye from the sharp metal edges. By moving the slide up or down to aline the window with one of the peepholes, the sight can be adjusted for the temperature of the rocket. When the slide is alined with the lower peephole, and only the word NORM is visible at the bottom, the sight is set for any temperature above 32°F. When the window in the slide is alined with the upper peephole, and the word COLD is visible, the sight is set for 32°F. and below.

Note. When setting the rear sight for the appropriate temperature, the gunner should remember that the temperature of the rocket propellant is the critical factor as to what setting should be used on the sight, not just the outside temperature, e.g., if the munition has been stored in a warm place, the NORM setting should be used even though the outside temperature may be below freezing.

4. Recocking

A recocking latch is used to recock the launcher before extending it, and when the launcher has failed to fire. After a failure to fire has been experienced, the recocking latch should not be activated until the following precautions have been taken: The gunner keeps the weapon on his shoulder, resqueezes the trigger, and waits for 10 seconds; at the completion of the waiting period he resets the trigger safety and removes the launcher from his shoulder; then he replaces the safety pin and waits an additional 60 seconds.

***Caution:* Should the safety pin hole for the rear safety pin be obstructed by the firing pin, do not attempt to replace it or collapse the launcher for recocking. Remove the launcher, as is, to a safe place and destory it in accordance with unit SOP.**

5. Placing M72 in Operation

a. Step 1. With the feet in the firing position, turn the upper portion of the body to the right. Pull out on the recocking latch to insure the weapon is cocked. Remove the rear cover retaining pin with the right hand, then rotate the rear cover downward and allow the sling assembly (including the front cover) to fall free.

Note. Gunner shoud be able to observe target area and backblast area.

b. Step 2. Holding the launcher out to the front, and away from the body with the left hand, grasp the rear sight cover and firing pin housing with the right hand, keeping the heel of the heel of the hand against the rear safety pin.

***Caution:* Hold launcher in position with left hand so no part of the body is forward or to the rear of the launcher, and the right arm is perpendicular to the weapon.**

c. Step 3. Extend the launcher by pulling out with the right hand until the inner (rear) tube is locked into the extended position.

***Caution:* Insure that the heel of the right hand is holding the rear safety pin in place while extending the launcher.**

d. Step 4. Check the setting on the rear sight, insuring it corresponds to the propellent temperature. Remove the rear safety pin with the right hand, keeping all parts of the hand clear of the backblast area.

e. Step 5. Place the launcher on the shoulder in

the firing position with the rear cover acting as a stock against the forward portion of the shoulder. Release the trigger safety by pushing it forward, aim and depress the trigger bar. Once the rocket has been fired the launcher is discarded.

6. Misfire Procedure

Once a failure to fire has been experienced, the gunner keeps the launcher on his shoulder, re-squeezes the trigger, and waits for 10 seconds. After waiting 10 seconds he returns the trigger safety handle to the safe position and reinserts the safety pin in the firing pin housing, then waits an additional 60 seconds before collapsing the launcher. After a 1-minute delay, squeeze the boot detent to retract the weapon at least 1 inch. Pull the recocking latch rod handle forward until it stops and release it. Grasp the rear sight cover and firing pin housing, keeping the heel of the right hand against the rear safety pin and re-extend the launcher to the locked position. Withdraw the safety pin.

Caution: **All this time the weapon must remain as near the on-target position as possible and the backblast area must be clear of personnel. Particular care should be taken by the gunner in removing the launcher from his shoulder, and keeping his body out of the backblast area during the recocking phase.**

Next, the weapon must be reaimed and the trigger safety handle pulled to the release position. Again squeeze the trigger bar. If the weapon still does not fire, wait 10 seconds before returning the trig-

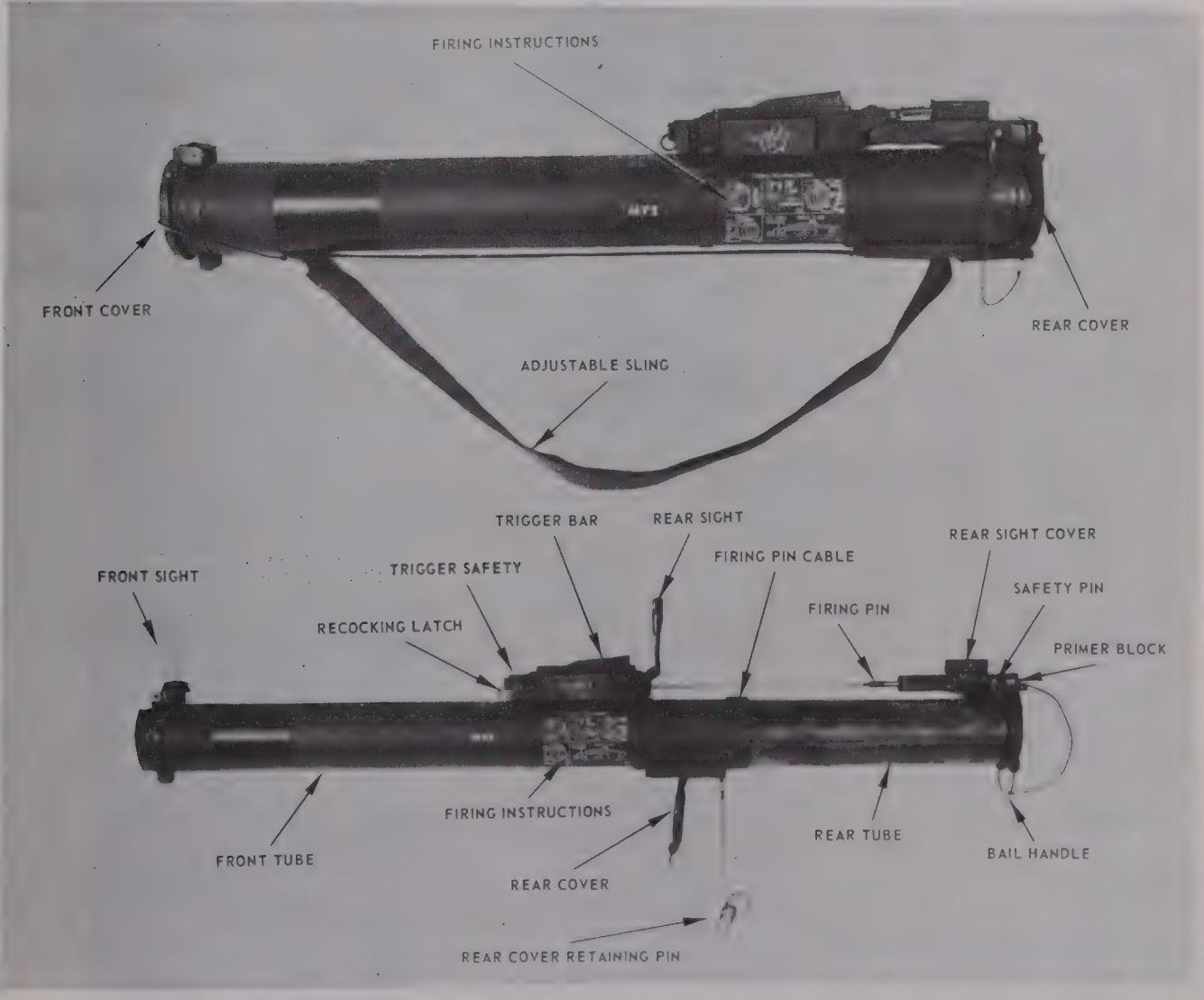


Figure 27. M72 launcher nomenclature.

ger safety to the safe position and before reinserting the safety pin in the launcher. Keep the weapon trained on the target area at least 1 minute; do not collapse the launcher; discard in accordance with procedures prescribed in TM 9–1950 and AR 385–63.

Caution: **Should the safety pin hole for the rear safety pin be obstructed by the firing pin, do**

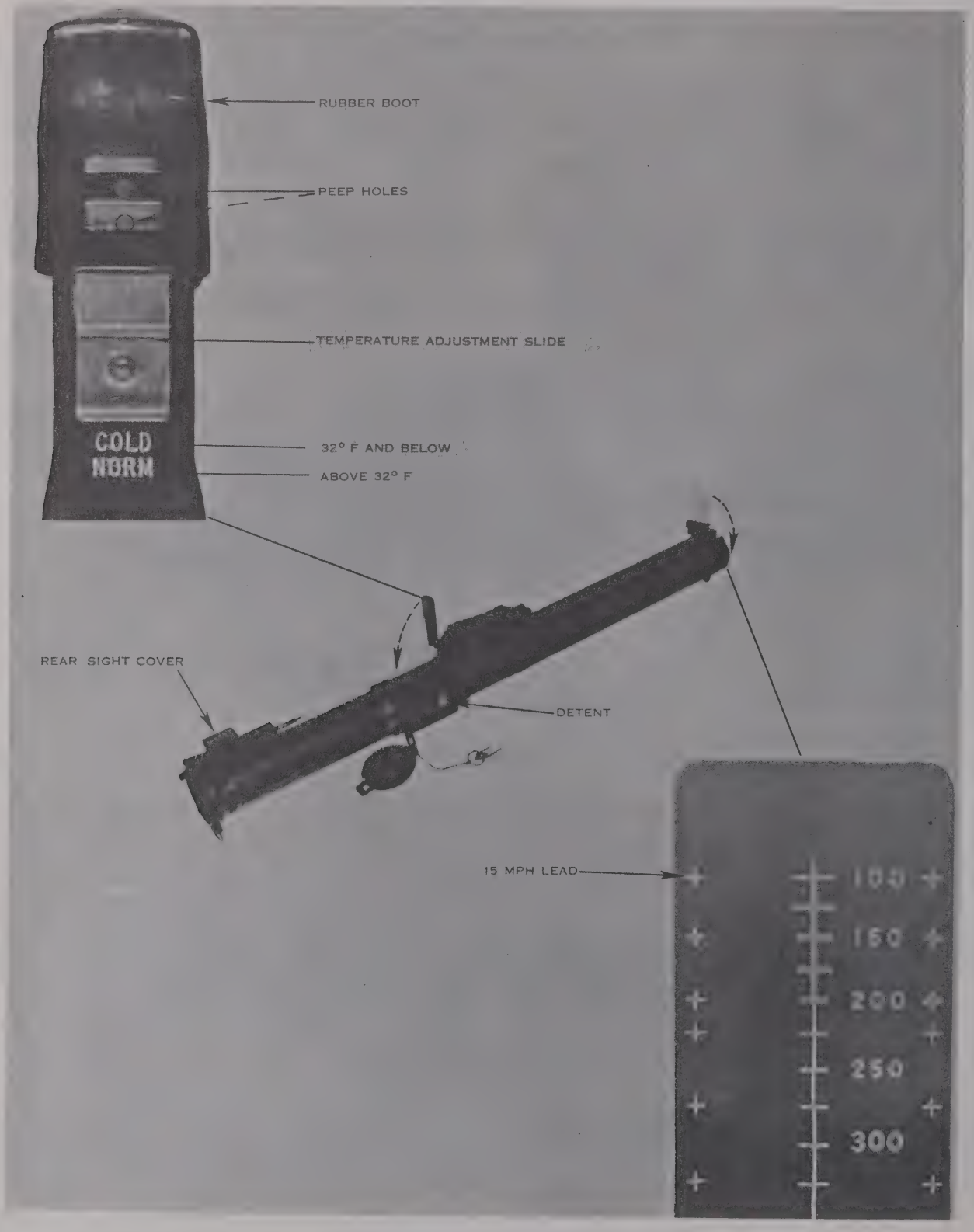


Figure 28. M72 sights.

not attempt to replace it or collapse the launcher for recocking. Remove the launcher, as is, to a safe place and destroy it in accordance with the unit SOP.

7. Restoring Launcher

In the event the M72 is prepared for firing but is not fired, it may be returned to the carry position by reversing the preparation procedure. First reset the trigger safety and then remove the launcher from the shoulder. Replace the rear safety pin insuring it is fully seated (the rubber "O" ring seal on the safety pin should not be visible). Depress the detent (fig 28) and partially collapse the launcher insuring the heel of the right hand is against the rear safety pin (fig 27). Fold the rear sight down so that it will slide into the sight cover as the launcher is completely collapsed. Fold the front sight forward over the muzzle and replace the front cover and sling assembly. The M72 is now back in its original state except that it is no longer waterproofed.

Caution: **The rear safety pin must not be removed until the launcher is fully extended. If the launcher is to be returned to the carry position, the rear safety pin must be replaced before the detent is depressed and the launcher is collapsed. If the safety pin is not replaced before the launcher is collapsed, the firing pin may strike the primer with sufficient force to fire the rocket.**

By Order of the Secretary of the Army:

W. C. WESTMORELAND,
General, United States Army,
Chief of Staff.

Official:

KENNETH G. WICKHAM,
Major General, United States Army,
The Adjutant General.

Distribution:

To be distributed in accordance with DA Form 12–11 requirements for 66MM, High Explosive Antitank Rocket, M72.

☆ U. S. GOVERNMENT PRINTING OFFICE : 1975 598-204/1621

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